

# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA23-26 | Balsall Common to Curzon Street

**Ecological baseline data: mammals (EC-003-004)**

Ecology

November 2013

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November 2013

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# Appendix EC-003-004

Environmental topic:	Ecology	EC
Appendix name:	Ecological baseline data (CFA23, CFA24, CFA25 and CFA26) mammals	003-004
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# 1 Introduction

1.1.1 This document is an appendix which forms part of Volume 5 of the environmental statement (ES) for the Proposed Scheme. It details ecological baseline data collected for the following community forum areas (CFA):

- CFA23: Balsall Common and Hampton-in-Arden;
- CFA24: Birmingham Interchange and Chelmsley Wood;
- CFA25: Castle Bromwich and Bromford; and
- CFA26: Washwood Heath to Curzon Street.

1.1.2 The document should be read in conjunction with Volume 2 (Community forum area reports), Volume 3 (Route wide effects) and Volume 4 (Off-route effects).

## 2 Bats

### 2.1 Introduction

2.1.1 This section of the appendix presents details of baseline information relating to bats relevant to the section of the Proposed Scheme that will pass through CFA23, CFA24, CFA25 and CFA26.

### 2.2 Methodology

2.2.1 Details of the standard methodology used for bat surveys are provided in Ecology technical note: Ecological field survey methods and standards (Volume 5: Appendix CT-001-000/2).

2.2.2 Following bat roost and activity surveys, it was considered that further detailed survey work was required at a number of locations. Bat trapping and radio tracking surveys were thus undertaken to identify rarer species likely to be present within the study area. Trapping and radio-tracking work was carried out under a Natural England project specific licence.

#### Bat trapping

2.2.3 Bat trapping was carried out using mist nets and harp traps. Trapping commenced at sunset and terminated at midnight or later depending on the activity levels. Any bats captured in a net were removed from the traps by the licence holder or a suitably experienced and qualified person. Bats were processed as soon as practicably possible and they were sexed, weighed (nearest 0.1gm), measured for forearm length (nearest 0.1mm), assessed for reproductive status, and any other general health observations noted. Bats considered suitably healthy were selected for radio-tagging. No underweight bats were selected for radio tagging. The weight of the radio-tag was always less than 7% of the animals' weight.

2.2.4 Radio transmitters were attached to the bats using an adhesive solution<sup>1</sup> to the area between the shoulder blades from which fur had been clipped. Bats that were fitted with radio-transmitters were released on the same night of capture once the transmitter had been secured.

2.2.5 An acoustic lure was used in areas with potential to support barbastelle species to increase potential for capture.

#### Radio tracking

2.2.6 To determine the position of radio tagged bats during the day (daytime roost locations) and night (commuting and foraging locations) the tagged bats were radio tracked by at least two surveyors on foot and/or by car using SIKA<sup>2</sup> or Australis<sup>3</sup> scanning receivers and a Yagi antenna and/or an omni directional dipole antenna

<sup>1</sup> Salts Healthcare latex adhesive solution 833005.

<sup>2</sup> Biotrack Incorporated, SIKA Radio Tracking Receiver

<sup>3</sup> Titley Scientific Australis 26k™ Scanning Receiver

attached to a car roof. The position of bats was determined by taking paired bearings sequentially from various known locations around the foraging area.

- 2.2.7 Time, compass bearing, GPS readings and weather were recorded on data sheets in the field. Each animal fitted with a radio transmitter was followed for a minimum of three and a maximum of seven nights, depending on the results obtained from the estimates of home range analysis.
- 2.2.8 Survey data was used to ascertain the frequency of use of the woodland and surrounding habitats by barbastelle (and other bat species). Locations of any roosts were also recorded.
- 2.2.9 Desk study records of known bat distributions within 5km of the land required for the Proposed Scheme were sourced from Ecorecord<sup>4</sup>. Desk study records date from within the last 10 years. It was considered that records older than this would not accurately reflect the current status of bats within the study area.
- 2.2.10 The findings of the bat survey results from the period July 2012 to August 2013 are presented in this report. Survey results are presented in map form at a scale of 1:5,000 or 1:10,000. Volume 5: Map series EC-05 'Bat - Roosts' present features of moderate bat roost potential or above and the locations of confirmed bat roosts (1:10,000). Volume 5: Map series EC-06 'Bat-Activity' presents the extent of activity surveys undertaken within each area (1:5,000).
- 2.2.11 The Warwickshire, Coventry and Solihull Local Biodiversity Action Plan for bats records twelve bat species as present within this sub region of Warwickshire, Coventry and Solihull<sup>5</sup>. The twelve species recorded comprise common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared (*Plecotus auritus*), noctule (*Nyctalus noctula*), Daubenton's bat (*Myotis daubentonii*), whiskered bat (*Myotis mystacinus*), Brandt's bat (*Myotis brandtii*), Natterer's (*Myotis nattereri*), Leisler's bat (*Nyctalus leisleri*), serotine (*Eptesicus serotinus*), barbastelle (*Barbastella barbastellus*) and lesser horseshoe (*Rhinolophus hipposideros*).

## 2.3 Deviations, constraints and limitations

- 2.3.1 The average temperatures experienced during the early 2013 survey season could have impacted on survey results. During the emergence/re-entry surveys completed in April 2013 the temperature dropped to 5°C and below at the end of a number of dusk surveys and was 0°C and below during a number of dawn re-entry surveys. Bats are less active at lower temperatures and as such this may have affected the survey results (particularly for the dawn surveys). Bats can remain torpid if cold temperatures persist and/or where poor weather conditions including rain and strong winds accompany cold temperatures.

<sup>4</sup> EcoRecord is the biological record centre for Birmingham and the Black Country (Dudley, Sandwell, Walsall & Wolverhampton).

EcoRecord; The Ecological Database for Birmingham and the Black Country; <http://www.ecorecord.org.uk/?q=home>; contacted April

<sup>5</sup> Warwickshire, Coventry and Solihull Local Biodiversity Action Plan (LBAP) - Species Action Plan for Bats; [www.warwickshire.gov.uk/biodiversity](http://www.warwickshire.gov.uk/biodiversity).

## Trees

2.3.2 Refinements to the methodology for surveying woodland blocks were made with a view to identifying key dispersal and foraging corridors within and originating from woodland parcels within the vicinity of the land required for the construction of the Proposed Scheme as well as key foraging habitats. These deviations were as follows:

- an initial roost potential assessment of each woodland area was carried out, rather than undertaking scoping and tree climbing assessments of individual trees within each woodland block. These assessments subsequently informed the requirement for additional surveys, and
- an appropriate suite of back-tracking, transect, activity and emergence/re-entry surveys were undertaken to identify woodland roosting sites, key dispersal corridors within and originating from woodland parcels, important foraging habitats and, programme permitting, specific roost locations.

## Buildings and structures

2.3.3 The bat survey methodology relating to the scoping of structures and residential properties within heavily urbanised areas of the proposed route was revised to allow scoping to be undertaken from Public Rights of Way (PRoW) and/or adjacent areas of land access.

## Activity surveys

2.3.4 Where possible all activity surveys were undertaken in appropriate ambient weather conditions for bat surveys i.e. above 10°C (dusk and dawn air temperatures) in accordance with best practice guidelines<sup>6</sup>. The prevailing weather conditions during the 2013 survey season were generally good for bat surveying, albeit below average night time temperatures were recorded in April. Surveys during prolonged heavy rainfall and high winds were avoided where possible.

2.3.5 Bats are less active at lower temperatures and will tend to remain torpid if cold temperatures persist and/or where poor weather conditions including rain and strong winds accompany cold temperatures.

2.3.6 All British bats are peripatetic and move between roosting sites both through seasons and within seasons. The absence of bats on a particular occasion does not necessarily rule out their presence at other times. An absence of physical signs does not always indicate absence of a roost.

## Static detector surveys

2.3.7 Static recorders (SM2+) were programmed to record in Wildlife Acoustics' proprietary lossless compression format (WAC) and converted to zero-crossing files using the WAC to WAV software and subsequently analysed using Analook software<sup>7</sup>. The limitations when surveying for bats when using ultrasonic detectors should be

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<sup>6</sup> Hundt (2012) *Bat surveys: Good Practice Guidelines*, 2nd edition, Bat Conservation Trust.

<sup>7</sup> [www.anabat.co.uk](http://www.anabat.co.uk)

acknowledged due to the variable properties in bat echolocation calls. Some bats, including brown long-eared bat, have very directional and quiet calls and are only easily detectable when the bat detector is in close range and facing in the direction of the bat. Data analysis has allowed identification of the majority of calls to species level with the exception of *Myotis* sp. However the lower amplitude of calls of some species, such as brown long-eared or barbastelle bats are more difficult to detect, especially when analysed in zero-crossing format. Therefore there is potential for such species to have been missed during data analysis assessments. The potential for some species of bat to be overlooked was reduced as much as possible during activity surveys through use of electronic detectors such as bat box duets and Pettersson bat detectors in combination with recording devices such as EM3 and Anabats and by directly observing bat behaviour where possible, since the combination of behaviour and size can be used in combination with the call characteristics to indicate the species being observed.

2.3.8 Due to land access constraints, it was not possible to deploy static recorders at all locations each month.

## 2.4 Baseline

### Balsall Common and Hampton-in-Arden (CFA23)

#### *Roosting (Trees)*

2.4.1 All isolated mature stand-alone trees within 100m of the land required for the construction of the Proposed Scheme were evaluated for roost potential. All wooded areas were given an overall assessment of bat suitability based on the deviation outlined in Section 2.3.

2.4.2 Four woodland parcels were subject to the woodland assessment within this area including:

- Marlowes (the wood on the junction between Park Lane and the A452 Kenilworth Road);
- Sixteen Acre Wood (the wood south of Berkswell Marsh Site of Special Scientific Interest (SSSI));
- the wood on the north side of Park Lane; and
- The Roughs (the wood east of Heart of England Way and west of Lavender Hall Lane).

2.4.3 This study area had a total of 347 trees which were subject to initial bat scoping assessment for features of potential for use as roosts, including loose bark, splits, cracks, woodpecker holes, knot holes, callus rolls and other cavities.

2.4.4 The following text outlines the tree assessments undertaken within the survey extent of the Balsall Common and Hampton-in-Arden area (CFA23):

- no confirmed tree roosts were identified during initial ground bat scoping

assessments;

2.4.5 55 trees containing features with high potential to support roosting bats were identified through initial scoping surveys undertaken from the ground;

2.4.6 179 trees containing features with moderate potential to support roosting bats were identified through initial scoping surveys undertaken from the ground; and

2.4.7 113 trees were assessed as having low to negligible potential to support roosting bats based on scoping surveys undertaken from the ground.

2.4.8 The 234 trees assessed as having high or moderate bat roost potential during the initial, ground-based scoping assessments were subsequently subject to detailed climbing and inspection surveys. Of these, 95 were downgraded to low potential or below as a consequence of detailed inspection and were not considered further.

2.4.9 Final assessments which were made subsequent to all scoping and tree climbing surveys within this area identified a total of 29 trees as having high bat roost potential, and 110 trees were assessed as having moderate bat roost potential (see Volume 5: Map series EC-05). Consequently, a total of 139 trees were subject to dusk emergence and dawn re-entry surveys within this area.

2.4.10 Eleven roosts were confirmed within the survey extent of this section of the Proposed Scheme, including:

- five roosts identified as occupied by soprano pipistrelle;
- five roosts identified as occupied by common pipistrelle; and
- one Daubenton's bat roost identified and confirmed via radio tracking surveys.

2.4.11 Nine of the 11 confirmed bat roosts identified were recorded as supporting between one and two individuals, or otherwise small numbers (five to 10), of those species present. These roosts were identified as being likely to be used as day roosts during the summer months. Roost location 040-BT3-154024, west of the River Blythe SSSI, supported over 12 common pipistrelle bats and may have been a mating roost. Daubenton's bats are considered widespread and common within the Warwickshire sub-region. The Daubenton's bat roost identified west of the River Blythe SSSI supported a small number of bats and was considered to be of limited importance in terms of maintaining the local conservation status of this species.

2.4.12 The number of confirmed tree roosts recorded was low within this area in comparison to the number of trees of high and moderate bat roost potential identified and surveyed (a total of 139), likely due to the sub-optimal temperatures experienced during the early 2013 survey season.

2.4.13 Confirmed tree roosts identified within the Balsall Common and Hampton-in-Arden area (CFA23) are shown in Table 1, and provided in Volume 5: Map EC-05.

2.4.14 The day roosts identified within the Balsall Common and Hampton-in-Arden area (CFA23) support common bat species that are not threatened or rare in Warwickshire

and are therefore not considered to be of significant importance in terms of maintaining the current conservation status of these species in this county.

2.4.15 In addition to the confirmed tree roosts, the following potential roosts were identified, where bats were seen, but were not confirmed emerging or re-entering during the course of the surveys:

- a *Pipistrelle* sp. roost within a mature oak located within the land north of Waste Lane (Volume 5: Map series EC-05-050b-C7). Conditions were recorded as suboptimal during the survey (-1°C during a dawn re-entry survey);
- a *Pipistrelle* sp. roost within an ash located at the junction between Park Lane and the A452 Kenilworth Road (Volume 5: Map series EC-05-051-E8);
- a *Pipistrelle* sp. roost within a mature ash located within the wood on the north side of Park Lane (Volume 5: Map series EC-05-051-F6);
- a common pipistrelle roost within a mature ash located within the wood on the north side of Park Lane (Volume 5: Map series EC-05-051-E7); and
- a common pipistrelle roost within a mature alder with woodpecker holes, adjacent to Marsh Lane (Volume 5: Map series EC-05-052-I8).

Table 1: Confirmed tree roosts within the Balsall Common and Hampton-in-Arden area (CFA23)

Ecology survey code	Location	OS grid reference	Tree species	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>8</sup> (m) and orientation
040-BT3-148070	Land on the south side of Truggist Lane, east of Berkswell Station	SP 24864 77540	Ash	soprano pipistrelle (1)	6 August 2013 Re-entry survey	Day roost	Woodpecker hole located on the main trunk	23	Within land required
040-BT3-149012	East of Bayleys Brook, north of Berkswell Station and west of Baulk Lane	SP 24396 77940	Oak	common pipistrelle (3)	8th May 2013 Emergence survey	Day roost	Oak with trunk and branch cavities facing west. All cavities run deep into the tree and stem off in different locations.	23	10m east
040-BT3-151018	Sixteen Acre Wood	SP 23237 79565	Oak	common pipistrelle (1)	5th June 2013 Emergence survey	Day roost	Woodpecker holes to the south	23	280m, north-east
040-BT3-153030	South of B4102 Meriden Road and west of Patrick Farm	SP 21457 81169	Ash	soprano pipistrelle (1)	9th May 2013 Re-entry survey	Day roost	Ash with large trunk cavity and dead wood	23	90m, west
040-BT3-153062	East of A452 Kenilworth Road and north of Marsh Lane Nature Reserve	SP 22241 80344	Oak	soprano pipistrelle (1)	13th August 2013 Emergence survey	Day roost	Oak with trunk and branch cavity, and ivy cover	23	Within land required
040-BT3-153084	South of B4102 Meriden Road and west of Patrick Farm	SP 21660 81180	Ash	soprano pipistrelle (1)	27th September 2012 Emergence survey	Day roost	Ash with ivy covered trunk	23	Within land required

<sup>8</sup>The phrase 'Within land required' represents an abbreviation of this term

Ecology survey code	Location	OS grid reference	Tree species	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>8</sup> (m) and orientation
040-BT3-153085	East of A452 Kenilworth Road and north of Marsh Lane Nature Reserve	SP 22140 80722	Oak	soprano pipistrelle (1)	13th August 2013 Emergence survey	Day roost	Oak with branch cavity and split	23	10m, north-east
040-BT3-153086	Land on the south side of B4102 Meriden Road and west of A452 Kenilworth Road	SP 2173 8130	Ash	common pipistrelle (2)	16 August 2012	Day Roost	Semi-mature ash with thick ivy cover	23	20m, north-east
040-BT3-154024	North of B4102 Meriden Road and west of Patrick Farm	SP 21323 81422	Ash	common pipistrelle (12)	4th June 2013 Emergence survey	Potential mating roost	Ash covered in ivy	23	Within land required
040-BT3-154031	North of B4102 Meriden Road and west of Patrick Farm	SP 21285 81525	Willow	common pipistrelle (1)	23rd July 2013 Re-entry survey	Day roost	Willow with split on the west side	23	Within land required
West of map reference EC-05-052-D10	Shadow Brook Lane, west of Hampton-in-Arden station	SP 20171 81346	Ash	Daubenton's bat (2) and <i>Pipistrelle</i> sp. (unknown but likely to be several)	30th August 2013 Day-time tracking survey	Day roost	Numerous cavities on the upper section of the trunk	23	600m, south-west

### *Roosting (building and structures)*

2.4.16 A total of 61 buildings were identified within 100m of the land required for the construction of the Proposed Scheme. Initial bat scoping assessments of the buildings within this area identified the following:

- an old brown long-eared bat roost (unoccupied at the time of the internal building inspection) at Pasture Farm (040-BS3-155039)
- a common pipistrelle roost within the building east of Marsh Lane Nature Reserve (040-BS3-152073);
- 30 buildings of high bat roost potential;
- 22 buildings of moderate bat roost potential; and
- nine buildings which were of low to negligible bat roost potential or otherwise scoped out.

2.4.17 Of the 61 buildings identified within 100m of the land required for the construction of the Proposed Scheme within this area, the 52 with high or moderate bat roost potential were subject to emergence/re-entry surveys during the period April 2013 to August 2013. In some areas where bat potential was identified, safe site access was not always possible.

2.4.18 Only one building was inspected internally for the presence of bats, other buildings were not inspected internally due to difficulties in obtaining home owner permission.

2.4.19 No underground structures such as caves or mines were known to be present within the Balsall Common and Hampton-in-Arden area (CFA23).

2.4.20 A total of 13 confirmed building roosts were recorded during emergence/re-entry surveys carried out during the 2012 and 2013 survey season within the survey extent of this area.

2.4.21 Common pipistrelle was the most recorded species at each site, with a total of eight roosts identified for this species alone. Three brown long-eared roosts were identified. A further two roosts were identified which supported both common pipistrelle and brown long-eared.

2.4.22 Of the 13 buildings or structures identified as supporting active roosts, all but two were confirmed as day roosts.

2.4.23 A brown long-eared night roost was recorded within a private residence on Diddington Lane (040-BS3-154083) during radio tracking surveys.

2.4.24 A maternity roost was confirmed at Diddington Farm (040-BS3-155072) in late May 2013. The building was a large red brick built former mansion house and stables that was used as a private boarding school. The maternity roost was initially identified on the 28th May 2013 with over 90 common pipistrelle recorded emerging from the roof apex of the southernmost hipped section of the roof, underneath a decorative fascia. A potential brown long-eared roost site was also identified during the initial survey

visit. Further surveys, undertaken on the 31st May and the 27th July 2013, confirmed the presence of two further roost sites: two single common pipistrelle were recorded exiting the southern slope of the northern most hipped section of the roof; and a further roost location, suspected to be used by brown long eared bats, was identified at the southern side of the tall chimney stack on the western aspect of the building. The maternity roost identified at this location is likely to be of significant importance with regard to maintenance of the local conservation status of common pipistrelle within this area.

2.4.25 Of the 11 day roosts identified within the survey extent of this area, all were occupied by either single individuals or small numbers of individuals of common species. It was therefore considered that the day roosts recorded were not of significant importance with regard to maintenance of the local conservation status of common pipistrelle or brown long-eared within this section of the land required for the construction of the Proposed Scheme.

2.4.26 Confirmed roosts identified in buildings and built structures within the Balsall Common and Hampton-in-Arden area (CFA23) are detailed in Table 2, and presented in Volume 5: Map series EC-05.

Table 2: Confirmed bat roosts within buildings and structures within the Balsall Common and Hampton-in-Arden area (CFA23)

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>9</sup> (m) and orientation
040-BS3-149013	Lavender Hall Farm	SP 23942 78089	Grade II listed 16th century brick built residential building surrounded by farm outhouses and one other grade II listed cottage of high potential	brown long-eared (1)	28 May 2013 Emergence Survey	Day roost	Brick build residential building with tile roof. Gaps between and under roof tiles allowing access to roof void (many gaps at all aspects)	23	20m, south-west
040-BS3-149074	On Baulk Lane, north of Berkswell Station	SP 24558 78044	Residential brick building Gaps under roof tiles and allowing access to roof void. Gap behind guttering in south-east corner. Multiple small gaps under hanging tiles.	common pipistrelle (4)	22 July 2013 Emergence Survey	Day roost	Bat roost was located at the south-east corner apex of the gable end of the house.	23	30m, east
040-BS3-150015	At the junction between Park Lane and the A452 Kenilworth Road	SP 23250 78680	Post 1950's residential one storey cottage with clay tiles and wooden soffit boxes. Brick work well seal and in good condition in most cases	soprano pipistrelle (2) common pipistrelle (2) brown long-eared (2)	17 September 2012 Emergence survey	Day roost	Bats roosts were located at the western gable end ( <i>Pipistrelle</i> sp.) and also recorded entering the roof apex (brown long-eared).	23	30m, south-west
040-BS3-	West of A452 Kenilworth Road and	SP 22335 79352	Rendered brick residential property with pitched tile roof. Small gaps under tiles and lead	common pipistrelle	6 August 2013	Day roost	Emergence from under the lead flashing on the southern side of the	23	130m south-west

<sup>9</sup>The phrase 'Within land required' represents an abbreviation of this term

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>9</sup> (m) and orientation
151085	north-east of Bradnocks Marsh		flashing and possible hole into soffit.	(1)	Emergence		chimney		
040-BS3-152018	West of A452 Kenilworth Road and north of Bradnocks Marsh	SP 22214 79542	Fairly modern pebble-dashed garage. Red brick walls. Gap under and between roof tiles and dense ivy cover in parts	common pipistrelle (1)	16 April 2013 Emergence survey	Day roost	Emergence recorded from under roof slate on the northern side of building	23	90m south-west
040-BS3-152020	Marsh Farm, east of A452 Kenilworth Road	SP 22121 80024	Brick built two storey residential property with garage attached to the east and conservatory on the west, two chimneys. Many gaps under roof tiles and between tiles allowing access to roof void, missing roof tiles, gaps under soffit board on the extension, mostly south facing.	common pipistrelle (1)	5 June 2012 Re-entry survey	Day roost	Common pipistrelle re-entered under the extension soffit on the southern aspect of the building	23	10m, south-west
040-BS3-152073	West of A452 Kenilworth Road and east of Marsh Lane Nature Reserve	SP 21956 80276	Residential brick building with tiled roof and plastic soffits. Gaps under tiles on south-west corner, cracks and possible gaps to S and W	common pipistrelle (2)	12 June 2013 Re-entry survey	Day roost	Roost located in southern cable end within a gap located at the pitch of the roof	23	10m, south-west
040-BS3-	Hornbrook Farm, south-	SP 22440 81160	Two storey brick built residential property with pitched roof.	common pipistrelle	19 July 2013	Day roost	This building contained multiple potential roosts. Three confirmed	23	190m, north-east

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>9</sup> (m) and orientation
153083	west of Cornets End Lane		Loose roof tiles allowing access to roof void -gaps between edge of roof tiles and that of the timber frame around the cable ends. Potential gaps on the apex at south of house.	(4)	Re-entry survey		during surveys were located on the southern and western gable ends - where bats were seen to re-enter through gaps at the apex and also between the roof tile edge and that of the timber flashing. A third roost site was identified on the eastern aspect of the house within a crack on the timber framing around one of the upper level windows.		
040-BS3-154081	Residential property on Diddington Lane	SP 21004 81643	Residential, two storey modern red brick house	common pipistrelle (more than 19)	8 August 2013 Emergence survey	Day roost	Incidental record noted during a survey of an adjacent residential property.	23	130m, south-west
040-BS3-154082	Residential property on Diddington Lane	SP 20977 81652	Residential, two storey modern red brick house	brown long-eared (1)	24 August 2013 Daytime radio tracking	Day roost	No access allowed to assess roost feature - roost confirmed via radio tracking survey	23	160m, south-west
040-BS3-154083	Residential property on Diddington Lane	SP 21042 81525	Residential, two storey modern red brick house	brown long-eared (1)	25 August 2013 Night-time radio tracking	Night roost	No access allowed to assess roost feature - roost confirmed via radio tracking survey	23	30m, south-west
040-BS3-	Pasture Farm south of A45	SP 20834 82770	Brick built 1960's farmhouse with numerous gaps under roof tiles allowing access to roof void,	brown long eared common	17 July 2013 Internal inspection	Day roost	Internal inspection in January 2013 recorded numerous brown long-eared droppings. During subsequent	23	10m, south-west

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>9</sup> (m) and orientation
155039	Coventry Road		missing slates, overhanging tiles, and most features to the west and south of the buildings. Owners have record bats in the loft place in previous years	pipistrelle (1)	and re-entry survey		activity surveys a common pipistrelle was recorded re-entering the north-east corner of the farmhouse underneath a loose tile.		
040-BS3-155072	Diddington Farm west of the A452 Kenilworth Road	SP 21481 82536	Large red brick built former mansion and stables now used as a private boarding special school. Oldest part of the building dates back to circa 1600-1800s. Pitched roof with numerous lifted and damaged tiles, dormer windows across all aspects of the buildings, stacked chimneys, soffit areas allowing access to roof voids and boxed eaves.	common pipistrelle (more than 94)	28 May 2013 Emergence survey	Maternity and day roost Multiple roosting opportunities throughout the building	Maternity roost location was noted at the roof apex of the southernmost hipped section of the roof underneath fascia Two single common pipistrelle recorded exiting the southern slope of the northern most hipped section of the roof. Another roost location identified at the southern side of the tall chimney stack on western aspect believed to be brown long-eared	23	180m, north-east

## Bat activity surveys

2.4.27 The following bat species have been recorded during bat activity surveys (transects, backtracking, static recorder and radio tracking surveys) conducted within the Balsall Common and Hampton-in-Arden area (CFA23):

- common pipistrelle;
- soprano pipistrelle;
- brown long-eared;
- noctule;
- Leisler's bat;
- serotine;
- *Myotis* sp.;
- Daubenton's bat;
- *Nyctalus* sp.; and
- barbastelle.

## Transect surveys

2.4.28 Due to updates in survey methodology and land access being considerably greater during the survey season of 2013, transect survey routes were amended to include key areas during the 2013 survey season to ensure surveys covered all relevant land.

2.4.29 Transects carried out within the Balsall Common and Hampton-in-Arden area (CFA23) during 2012 are outlined within Table 3, and the transect routes are presented in Volume 5: Map series EC-06 at a scale of 1:5,000.

Table 3: Transect surveys conducted within the Balsall Common and Hampton-in-Arden area (CFA23) during 2012.

Ecology survey code	Transect location	Number of surveys conducted	First survey date	Final survey date	CFA	Map Reference
040-BA1-148001	Beechwood Farm	3	01 August 2012	18 September 2012	23	EC-06-100b-C4
040-BA1-148002	Land north of Waste Lane	3	24 July 2012	30 August 2012	23	EC-06-100b-A8
040-BA1-149003	Lavender Hall Fisheries	3	23 July 2012	21 September 2012	23	EC-06-101-D3
040-BA1-155005	Land south of A45 Coventry Road and west of A452 Kenilworth Road	2	13 September 2012	08 October 2012	23	EC-06-105a-H3
040-BA1-155006	Land south of Pasture Farm and north of Shadow Brook	3	24 July 2012	21 September 2012	23	EC-06-105a-G10

### **Beechwood Farm**

2.4.30 Bat Activity Transect results for 040-BA1-148001 are shown in Table 4.

Table 4: Bat activity transect survey results - Transect 040-BA1-148001.

Ecology survey code	Transect location				Description of habitats covered by transect																		
Visit number and date	Weather conditions				Total species passes during transect survey <sup>10</sup>																		
	Temp (°C)	Cloud (0-8) <sup>11</sup>	Rain (0-5) <sup>12</sup>	Wind (0-12) <sup>13</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep		
Visit 1: 01 August 2012	15.8(start) 14.7 (finish)	4	1	2	62	6	-	1	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-
Visit 2: 31 August 2012	8.3 (start) 4.1 (finish) Sub-optimal temperature	1-2	0	0	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 3: 17 September 2012 and 18 September 2012	15.0 (start) 13.6 (finish)  9.5 (start) 8.5 (finish)	6  2	0  0	2  2	17  6	2  -	-  -	6  -	-  -	-  -	2  -	-  -	-  -	-  -	-  -								

<sup>10</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>11</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>12</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>13</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.31 Three transect surveys were carried out at Beechwood Farm during 2012. The highest peak count on any one night was that of common pipistrelle when of 62 passes were recorded and the majority of passes over the course of all three visits were attributed to common pipistrelle. Six *Myotis* sp. registrations were recorded during the September 2012 transect survey.

#### **Land north of Waste Lane**

2.4.32 Bat Activity Transect results for 040-BA1-148002 are shown in Table 5.

Table 5: Bat activity transect survey results - Transect 040-BA1-148002.

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>14</sup>																
	Temp (°C)	Cloud (0-8) <sup>15</sup>	Rain (0-5) <sup>16</sup>	Wind (0-12) <sup>17</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 24 July 2012	11.0 (start) 10 (finish)	0	0	0	14	-	-	15	-	-	-	-	-	-	1	-	-	-	-	-	-
Visit 2: 30 July 2012	11.2 (start) 11.0 (finish)	4	0	0-1	21	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Visit 3: 30 August 2012	12.5 (start) 12.0 (finish)	4	0	0-2	3	1	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-

<sup>14</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>15</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>16</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>17</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.33 Transect survey 040-BA1-148002 covered the land north of Waste Lane. This transect was conducted three times in 2012. Common pipistrelle was again the dominant species recorded during each transect. Peak registrations of this species reached 21 during the late July transect. Records of other bat species during the 2012 transects at this location were scarce and limited to one *Myotis* sp. pass and two *Nyctalus* sp. passes.

### **Lavender Hall Fisheries**

2.4.34 Bat Activity Transect results for 040-BA1-149003 are shown in Table 6.

Table 6: Bat activity transect survey results - Transect 040-BA1-149003.

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>18</sup>																
	Temp (°C)	Cloud (0-8) <sup>19</sup>	Rain (0-5) <sup>20</sup>	Wind (0-12) <sup>21</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 23 July 2012	19.0 (start) 18.0 (finish)	0	0	0	1	-	-	4	-	-	-	-	-	-	1	-	-	-	-	-	-
Visit 2: 08 August 2012	14.0 (start) 14.2 (finish)	6	0	0	27	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Visit 3: 30 August 2012	12.4 (start) 15.0 (finish)	3-8	1	0-1	1	2	-	2	-	-	-	-	-	-	1	-	-	2	-	-	-
Visit 4: 20 September 2012 and 21 September 2012	13.5 (start) 12.5 (finish) 10.5 (start) 10.3 (finish)	5 6	0 0	2 0	23 29	12 6	-	-	-	3 1	-	-	-	-	1 5	-	-	-	-	-	1

<sup>18</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>19</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>20</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>21</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.35 Transect 040-BA1-149003 covers Lavender Hall Fisheries and Baulk Lane. Four species were recorded foraging and/or commuting within the land covered and included common and soprano pipistrelle, *Pipistrelle* sp., *Myotis* sp. and *Nyctalus* sp. The highest number of registrations for all species was recorded during the September 2012 replicate. Common pipistrelle had the highest peak in registrations at 52 with four passes of *Myotis* sp. and Daubenton's bat recorded foraging predominantly over the artificial lakes of Lavender Hall Fisheries.

**Land south of A45 Coventry Road and west of A452 Kenilworth Road**

2.4.36 Bat Activity Transect results for 040-BA1-155005 are shown in Table 7.

Table 7: Bat activity transect survey results - Transect o40-BA1-155005.

Ecology survey code	Transect location				Description of habitats covered by transect																	
o40-BA1-155005	Land south of A45 Coventry Road and west of A452 Kenilworth Road				Arable fields between Pasture Farm and east to A452 Kenilworth Road, including Shadow Brook.																	
Visit number and date	Weather conditions				Total species passes during transect survey <sup>22</sup>																	
	Temp (°C)	Cloud (0-8) <sup>23</sup>	Rain (0-5) <sup>24</sup>	Wind (0-12) <sup>25</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
Visit 1: 13 September 2012 and 14 September 2012	14.0 (start) 11.0 (finish) 14.0 (start) 13.0 (finish)	2-6 7	0 0	4 4	72 11	6 1	- -	1 -	- -	- -	1 -	- -	- -									
Visit 2: 04 October 2012	7.0 (start) 7.0 (finish)	0	0	3	51	20	-	4			-	-	-	-		2	-	-	-	-	-	-
Visit 3: 08 October 2012	12.8 (start) 10.5 (finish)	6	0	0-2	10	11	2	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-

<sup>22</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>23</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>24</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>25</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.37 Three transect surveys of the land south of A45 Coventry Road and west of A452 Kenilworth Road were carried out in 2012. The majority of the passes were attributed to common pipistrelle with peak registrations being 83 during the September 2012 replicate. *Myotis* sp. was identified predominately commuting along Shadow Brook and the hedgerows south of Pasture Farm in lower abundance.

**Land south of Pasture Farm and north of Shadow Brook**

2.4.38 Bat Activity Transect results for 040-040-BA1-155006 are shown in Table 8.

Table 8: Bat activity transect survey results - Transect 040-BA1-155006.

Ecology survey code	Transect location				Description of habitats covered by transect																	
040-BA1-155006	Land south of Pasture Farm and north of Shadow Brook				Shadow Brook and arable fields south of Pasture Farm.																	
Visit number and date	Weather conditions				Total species passes during transect survey <sup>26</sup>																	
	Temp (°C)	Cloud (0-8) <sup>27</sup>	Rain (0-5) <sup>28</sup>	Wind (0-12) <sup>29</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
Visit 1: 24 July 2012	23.0 (start) 21.0 (finish)	0	0	0	3	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 2: 04 September 2012	14.7 (start) 14.5 (finish)	4	0	0	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 3: 20 September 2012 and 21 September 2012	12.9 (start) 11.8 (finish) 12.3 (start) 10.2 (finish)	7 4	0 0	2 0	19 1	6 3	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-

<sup>26</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>27</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>28</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>29</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.39 Three transect surveys of the land south of Pasture Farm and north of Shadow Brook were carried out in 2012. The majority of the passes were attributed to common pipistrelle (20) and soprano pipistrelle (9). One *Myotis* sp. and one noctule were recorded commuting close to Shadow Brook.

2.4.40 Transects carried out within the Balsall Common and Hampton-in-Arden area (CFA23) during 2013 are outlined in Table 9, and transect routes are presented in Volume 5: Map series EC-06 at a scale of 1:5,000.

Table 9: Transect surveys conducted within the Balsall Common and Hampton-in-Arden area (CFA23) during 2013.

Ecology survey code	Transect location	Number of surveys conducted	First survey date	Final survey date	CFA	Map Reference
040-BA1-149002	Lavender Hall Farm and Lavender Hall Fisheries	1	08 May 2013	08 May 2013	23	EC-06-101-B6
040-BA1-150006	The Marlowes, the pond located between The Bogs and The Roughs woodland, The Roughs and the wood on the north side of Park Lane	2	08 April 2013	05 June 2013	23	EC-06-102-E6
040-BA1-153003	East of Marsh Lane Nature Reserve Patrick Farm and north of B4102 Meriden Road	2	05 June 2013	07 July 2013	23	EC-06-103-B8
040-BA1-153007	Berkswell Marsh SSSI and Berkswell Marsh Meadow LWS	1	09 April 2013	09 April 2013	23	EC-06-103-D6
040-BA1-155004	Land east and west of Diddington Lane including Pasture Farm and Diddington Farm	1	15 May 2013	15 May 2013	23	EC-06-105a-F3

### Lavender Hall Farm and Lavender Hall Fisheries

2.4.41 Bat Activity Transect results for 040-BA1-149002 are shown in Table 10.

Table 10: Bat activity transect survey results - Transect o40-BA1-149002.

Ecology survey code	Transect location				Description of habitats covered by transect																
o40-BA1-149002	Lavender Hall Fisheries				Lavender Hall Fisheries, Lavender Hall Farm, Bayleys Brook and associated semi-improved and improved grasslands																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>30</sup>																
	Temp (°C)	Cloud (0-8) <sup>31</sup>	Rain (0-5) <sup>32</sup>	Wind (0-12) <sup>33</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 08 May 2013	10.8 (start) 10.7 (end)	2	0	2	215+	18	-	-	-	-	-	-	-	-	20	-	-	1	-	50+	-

<sup>30</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>31</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>32</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>33</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.42 A similar transect (040-BA1-149003) undertaken in 2012 had covered a similar area of Lavender Hall Fisheries, Lavender Hall Farm, Bayleys Brook and associated semi-improved and improved grasslands(see Table 6). The change in route in 2013 was due to changes in the proposed alignment and a greater extent of land access. However, the two routes were ostensibly the same and the transect was undertaken once in 2013.

2.4.43 Over 303 bat passes were recorded during the activity survey in 2013. Foraging was the dominant behaviour recorded with over 200 foraging passes recorded. Passes were recorded predominantly at the land to the east of Lavender Hall Farm and along Bayleys Brook. The majority of the foraging calls were attributed to common pipistrelle and serotine. Serotine bats had not been recorded during the surveys in 2012 nor were there any records from the desk study results. Twenty passes were attributed to foraging *Myotis* sp. In the majority of cases these were likely to represent Daubenton's bat which were also recorded foraging over the large fishing ponds.

**The Marlowes, the pond located between The Bogs and The Roughs woodland, The Roughs and the wood on the north side of Park Lane**

2.4.44 Bat Activity Transect results for 040-BA1-150006 are shown in Table 11.

Table 11: Bat activity transect survey results - Transect o40-BA1-150006.

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>34</sup>																
	Temp (°C)	Cloud (0-8) <sup>35</sup>	Rain (0-5) <sup>36</sup>	Wind (0-12) <sup>37</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 08 April 2013 (suboptimal temperatures)	6 (start) 2 (end)	7	0	6	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 2: 05 June 2013	14.2 (start) 7.5 (end)	2	0	0	40	-	-	3	-	2	-	-	-	-	2	-	-	17	-	-	-

<sup>34</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>35</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>36</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>37</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.45 It should be noted that access to all areas of value to bats was not possible in 2012 due to access constraints and the activity survey was largely conducted within and around Marlowes wood and within the woodland on the north side of Park Lane. No access was permitted within the vicinity of Berkswell Marsh Meadow LWS, the wood north-east of Berkswell Marsh Meadow LWS and sections of Sixteen Acre Wood, all of which are considered to provide optimal bat foraging habitat. The transect incorporated important linear features such as species rich hedgerows and the pond located between The Bogs and The Roughs woodland. The initial transect survey was conducted during suboptimal conditions when temperatures were below 5°C and when bat activity was likely to have been limited. A replicate survey undertaken early in June identified the edges of the wood on the north side of Park Lane and The Roughs as being used by commuting common pipistrelle, with a total of 40 registrations recorded. Noctule foraging activity was also recorded within the vicinity of the pond located between The Bogs and The Roughs woodland.

**East of Marsh Lane Nature Reserve Patrick Farm and north of B4102 Meriden Road**

2.4.46 Bat Activity Transect results for 040-BA1-153003 are shown in Table 12.

Table 12: Bat activity transect survey results - Transect 040-BA1-153003

Ecology survey code	Transect location				Description of habitats covered by transect																
040-BA1-153003	East of Marsh Lane Nature Reserve and north of B4102 Meriden Road				River Blythe SSSI and associated semi-natural riparian habitat, semi-improved and arable grasslands, Marsh Lane Nature Reserve and its associated semi-mature broadleaved woodland areas as well as Patrick Farm commercial and residential properties.																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>38</sup>																
	Temp (°C)	Cloud (0-8) <sup>39</sup>	Rain (0-5) <sup>40</sup>	Wind (0-12) <sup>41</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm /Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
Visit 1: 07 May 2013	15.8 (start) 13 (end)	1	0	2	76	78	-	5	-	-	-	-	-	-	2	-	-	40	9	-	1
Visit 2: 05 June 2013	11 (start) 10 (end)	4	0	1	15	19	-	24	-	-	-	-	-	-	-	-	-	3	-	-	-

<sup>38</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>39</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>40</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>41</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.47 Common and soprano pipistrelle passes were relatively high within the area of land surrounding the River Blythe SSSI and that of Marsh Lane Nature Reserve during the survey replicate undertaken in May 2013 when compared to the June 2013 replicate. The dominant behaviour recorded was foraging, particularly along the northern boundary of Marsh Lane Nature Reserve and the River Blythe SSSI, north of the reserve. Noctule activity was particularly notable during the May transect where activity was predominantly recorded immediately west of River Blythe SSSI, and north of Meriden Road Bridge where the riparian habitat is dominated by semi-mature and mature broadleaved woodland.

### **Berkswell Marsh SSSI and Berkswell Marsh Meadow LWS**

2.4.48 Bat Activity Transect results for Transect 040-BA1-153007 are shown in Table 13.

Table 13: Bat activity transect survey results - Transect o40-BA1-153007

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>42</sup>																
	Temp (°C)	Cloud (0-8) <sup>43</sup>	Rain (0-5) <sup>44</sup>	Wind (0-12) <sup>45</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 09 April 2013	8.0(start) 6.0 (end) – sub-optimal temperature	4	0	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

<sup>42</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>43</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>44</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>45</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.49 Only one transect was carried out within the Sixteen Acre Wood. A single common pipistrelle was recorded during the course of the transect survey, and the absence of bat passes was likely to be a result of the low temperatures and sub-optimal conditions. Land access to this land parcel was withdrawn and consequently no further surveys could take place.

**Land east and west of Diddington Lane including Pasture Farm and Diddington Farm**

2.4.50 Bat Activity Transect results for Transect 040-BA1-155004 are shown in Table 14.

Table 14: Bat activity transect survey results - Transect o40-BA1-155004.

Ecology survey code	Transect location				Description of habitats covered by transect																
o40-BA1-155004	Land east and west of Diddington Lane including Pasture Farm and Diddington Farm.				Shadow Brook and associated semi-natural broadleaved woodland, improved and arable grasslands, and associated ponds, Pasture Farm buildings and associated semi-natural broadleaved, Diddington Farm.																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>46</sup>																
	Temp (°C)	Cloud (0-8) <sup>47</sup>	Rain (0-5) <sup>48</sup>	Wind (0-12) <sup>49</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 15 May 2013	10 (start) 10 (end)	2	0	1	33	7	-	1	-	-	-	-	-	-	3	-	-	-	-	1	

<sup>46</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>47</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>48</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>49</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.51 Transect 040-BA1-155004 incorporated the land east and west of the northern section of Diddington Lane and north of Shadow Brook. Similar transects were undertaken in 2012 (040-BA1-155005 and 040-BA1-155006), therefore 040-BA1-155004 was only undertaken once in 2013. In 2013, the route of this transect was amended due to greater land access and subsequently incorporated the land south of Pasture Farm.

2.4.52 The dominant species recorded in 2012 was common pipistrelle, which was recorded commuting in the vicinity of Shadow Brook. This findings were similar to the 2013 transect survey results where common pipistrelle was the main species recorded, albeit in lower abundance, commuting between land in the vicinity of Diddington Farm and Shadow Brook.

### *Static surveys*

2.4.53 A number of sites were identified close to features of potential value to bats and were subsequently surveyed using SM2BAT+ recorders. The sites were chosen to provide coverage of the land required for the construction of the Proposed Scheme where route alignment could result in severance of potentially important foraging and commuting routes. These surveys were termed 'static surveys' and were replicated throughout the period April 2013 to July 2013. Bat call analysis was undertaken for a minimum of five nights for each site surveyed. The peak count of each species during monthly recordings is provided in the tables below. The locations of the static recorders are shown on Volume 5: Map series EC-06 at a scale of 1:5,000.

### **Kenilworth Greenway**

2.4.54 A summary of static detector monitoring results for 040-BA2-148008 are provided in Table 15.

2.4.55 A summary of static detector monitoring results for 040-BA2-148009 are provided in Table 16.

Table 15: Summary of static detector monitoring results for 040-BA2-148008

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-148008	South-west of Beechwood Farm on the eastern boundary of the Kenilworth Greenway	SP 25328 77069	Static detector located on the boundary of the disused railway line - on the boundary of the improved grassland of Beechwood Farm and that of the semi-natural broadleaved woodland which forms the Kenilworth Greenway.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>50</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
26 April to 01 May 2013	6	1, 202	46	-	1	-	-	-	-	-	-	5	-	-	-	-	-	1
23 May to 27 May 2013	5	316	18	-	4	-	-	-	-	-	-	126	-	-	43	-	-	26
18 July to 24 July 2013	6	813	46	-	5	-	-	-	-	-	-	6	-	-	-	-	-	1

<sup>50</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 16: Summary of static detector monitoring results for 040-BA2-148009

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-148009	Kenilworth Greenway, south-east of Berkswell Station.	SP 24923 77324	Static detector located within the semi-natural broadleaved woodland of Kenilworth Greenway															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>51</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
19 July to 24 July 2013	6	319	19	-	3	-	-	-	-	-	-	9	2	-	2	-	-	-

<sup>51</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.56 A total of six bat species were identified using Kenilworth Greenway, the surrounding land of Beechwood Farm and the land north of Waste Lane for either foraging or commuting purposes. The static detector was located on the northern boundary of Kenilworth Greenway within the Beechwood Farm land boundary (040-BA2-148008) and recorded a peak registration of 1202 common pipistrelle in April 2013 and up to 126 *Myotis* sp. passes during the May 2013 deployment. Static 040-BA2-148009 was located within the semi-natural broadleaved woodland of Kenilworth Greenway north of Bayleys Brook and immediately east of Berkswell station. Peaks in common pipistrelle registrations were recorded at this site. Other species identified utilising Kenilworth Greenway included noctule, *Nyctalus* sp., brown long-eared and Pipistrelle sp.

2.4.57 The area surrounding Kenilworth Greenway has one confirmed roost (040-BT3-148070) and a number of potential roost sites. The habitats immediately surrounding this linear corridor included optimal commuting routes and foraging areas such as ponds, semi-improved neutral grasslands and hedgerows of importance that contained mature broadleaved species, the most frequent of which was oak.

### **Lavender Hall Fisheries**

2.4.58 A summary of static detector monitoring results for 040-BA2-149007 are provided in Table 17.

Table 17: Summary of static detector monitoring results for 040-BA2-149007.

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-149007	Land to the east of Lavender Hall Farm	SP 24376 77820	Static detector located at the artificial fisheries east of Lavender Hall Farm surrounded by improved grassland to the east and Bayleys Brook.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>52</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
23 May to 28 May 2013	6	805	119	-	91	-	7	-	-	-	-	279	-	-	54	10	2	29

<sup>52</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.59 The land required for the Proposed Scheme runs parallel to the north of the land parcels east of Lavender Hall Farm and the active rail line which serves Berkswell Station. The land to the east of Lavender Hall Farm contained a set of artificial ponds created over a decade ago. Analysis of static recorder results from 040-BA2-149007 identified bat passes from nine bat species in this area, with common pipistrelle recorded foraging almost continuously in the immediate vicinity of the ponds. To a lesser extent rarer species such as noctule, serotine and *Myotis* sp. were also recorded. Daubenton's bat were recorded in abundance foraging almost continuously over the artificial ponds during the course of the transect surveys undertaken at this location.

2.4.60 A confirmed brown long-eared roost was identified at Lavender Hall Farm (040-BS3-149013), located 20m from the land required for the construction of the Proposed Scheme. The mosaic of habitat types in the general vicinity of this location is interconnected by Bayleys Brook. Bayleys Brook provides an optimal commuting corridor for bats dispersing between the artificial ponds to the east of Lavender Hall Farm and the various suitable habitats to the north-west of Lavender Hall Farm. This general area is of high value to foraging and commuting bats and supports a number of common bat species as well as populations of rarer species, including serotine, noctule and *Myotis* sp., all of which were recorded in relatively high numbers.

#### **Wood on the north side of Park Lane**

2.4.61 A summary of static detector monitoring results for 040-BA2-150013 are provided in Table 18.

2.4.62 A summary of static detector monitoring results for 040-BA2-150014 are provided in Table 19.

Table 18: Summary of static detector monitoring results for 040-BA2-150013.

Ecology survey code	Location	OS Grid		Description of habitat															
040-BA2-150013	Wood on the north side of Park Lane	SP23524 78604		Static detector located at the mixed plantation woodland at Park Lane.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>53</sup>																	
Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep			
04 July to 06 July 2013	1.5	8	129	-	15	-	-	-	-	22	1	-	-	-	-	-	2		

Table 19: Summary of static detector monitoring results for 040-BA2-150014.

Ecology survey code	Location	OS Grid		Description of habitat															
040-BA2-150014	Wood on the north side of Park Lane	SP 23427 79156		Static detector located at the mixed plantation woodland at Park Lane.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>54</sup>																	
Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep			
04 July to 11 July 2013	7	707	987	-	44	-	-	-	-	31	-	-	11	3	-	17			

<sup>53</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>54</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.63 Technical problems with the static bat detector deployed during the early July deployment of 040-BA2-150013 led to only 1.5 nights of analysis being recorded. A total of seven species were recorded within and around the wood on the north side of Park Lane. This area was dominated by mixed plantation woodland and afforded connectivity between Marlowes wood, The Roughs and Bayleys Brook. The greatest number of registrations recorded at this location was of common and soprano pipistrelle. Other species recorded include brown long-eared, noctule, Leisler's bat and Nyctalus sp.

#### **Land west of A452 Kenilworth Road and north of Park Lane**

2.4.64 A summary of static detector monitoring results for 040-BA2-150009 are provided in Table 20.

2.4.65 A summary of static detector monitoring results for 040-BA2-150010 are provided in Table 21.

2.4.66 A summary of static detector monitoring results for 040-BA2-150012 are provided in

2.4.67 Table 22.

2.4.68 A summary of static detector monitoring results for 040-BA2-151018 are provided in Table 23.

2.4.69 A summary of static detector monitoring results for 040-BA2-151013 are provided in Table 24.

2.4.70 A summary of static detector monitoring results for 040-BA2-151014 are provided in Table 25.

Table 20: Summary of static detector monitoring results for 040-BA2-150009

Ecology survey code	Location	OS Grid	Description of habitat																
040-BA2-150009	The Marlowes.	SP 23299 78785	Static detector located at the mixed plantation woodland at the Marlowes.																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>55</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep	
25 April to 30 April 2013	7	30	105	-	-	-	-	-	-	-	-	8	-	-	-	-	-	2	
20 May to 26 May 2013	7	12	322	-	3	-	-	-	-	-	-	47	-	-	99	-	2	30	
04 July to 10 July 2013	7	89	639	-	15	-	-	-	-	-	-	390	1	-	-	-	-	8	

Table 21: Summary of static detector monitoring results for 040-BA2-150010

Ecology survey code	Location	OS Grid	Description of habitat																
040-BA2-150010	East of Marlowes	SP 23529 78933	Static detector located at the eastern verge of the Marlowes - an area of mixed plantation woodland - static located within a wooden outhouse which is open to the east																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>56</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep	
25 April to 29 April 2013	6	127	-	-	17	-		-	-	-	-	4	-	-	1	-	-	-	
20 May to 26 May 2013	7	29	22	-	7	-	-	-	-	-	-	7	-	-	9	1	-	8	

<sup>55</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>56</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 22: Summary of static detector monitoring results for 040-BA2-150012

Ecology survey code	Location	OS Grid		Description of habitat														
040-BA2-150012	The Marlowes.	SP 23385 78874		Static detector located within mixed plantation woodland within the Marlowes.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>57</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
04 July to 10 July 2013	7	66	144	-	-	-	1	11	-	-	-	55	-	-	-	-	-	-

Table 23: Summary of static detector monitoring results for 040-BA2-151018

Ecology survey code	Location	OS Grid		Description of habitat														
040-BA2-150018	The Marlowes	SP 23369 79235		Static detector located within mixed plantation woodland just north of the Marlowes.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>58</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
05 July to 09 July 2013	7	133	1212	-	10	-	-	-	-	-	-	470	3	-	17	48	5	3

<sup>57</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>58</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 24: Summary of static detector monitoring results for 040-BA2-151013

Ecology survey code		Location		OS Grid		Description of habitat														
040-BA2-151013		The Marlowes		SP23427 79156		Static detector located within mixed plantation woodland just north of the Marlowes.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>59</sup>															Ny/Ep			
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es			
04 July to 10 July 2013	7	69	232	-	32	-	-	-	-	-	-	59	-	1	56	17	-	1		

Table 25: Summary of static detector monitoring results for 040-BA2-151014

Ecology survey code		Location		OS Grid		Description of habitat														
040-BA2-151014		North of Marlowes wood		SP23430 79377		Static detector located within mixed plantation woodland north of the Marlowes.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>60</sup>															Ny/Ep			
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es			
25 April to 29 April 2013	7	6	17	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-		
20 May to 26 May 2013	7	16	28	-	10	-	-	-	-	-	-	83	4	-	19	-	-	-		
04 July to 10 July 2013	7	436	865	-	12	-	-	-	-	-	-	332	4	-	19	8	-7	-1		

<sup>59</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>60</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.72 Static recorders were set out within Marlowes Wood and within the Bogs woodland focusing on linear habitat corridors within potential foraging areas, where access permitted. The Marlowes contained predominantly mixed plantation woodland and was located immediately east of the A452 Kenilworth Road. This woodland contained ancient rides considered optimal for commuting bats, including rarer species such as barbastelle. An area of semi-improved neutral grassland occurred within the centre of the woodland area and provided optimal foraging habitat. A total of nine species were recorded in this location with peak registrations of 436 and 865 for common and soprano pipistrelles respectively. Other species recorded included *Myotis* sp., noctule, serotine, *Nyctalus* sp., Daubenton's bat, Natterer's and brown long-eared foraging and commuting throughout the area in low abundance.

2.4.73 A single registration of barbastelle was recorded during the July deployment and subsequently confirmed.

**Pond located between The Bogs and The Roughs woodland**

2.4.74 A summary of static detector monitoring results for 040-BA2-151012 are provided in Table 26.

Table 26: Summary of static detector monitoring results for 040-BA2-150012.

Ecology survey code	Location	OS Grid		Description of habitat																
040-BA2-151012	Large pond	SP 23694 79263		Static detector located at the pond located between The Bogs and The Roughs woodland.																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>61</sup>																		
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep		
25 April to 30 April 2013	7	10	116	-	264	-	-	-	-	-	-	309	-	-	1	-	3	2		
20 May to 25 May 2013	7	531	223	-	210	-	-	-	-	-	-	1,088	2	2 <sup>62</sup>	-	-	-	-		

<sup>61</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>62</sup> Two possible barbastelle calls

2.4.75 Common species including common and soprano pipistrelle and brown long-eared were all recorded within the vicinity of the pond located between The Bogs and The Roughs woodland. Rarer species such as noctule and serotine were briefly recorded (three registrations or less of each species) during the April deployment.

2.4.76 Of significance were records of two barbastelle passes; the records were recorded during the May 2013 static deployment and were subsequently confirmed through sound analysis.

2.4.77 The pond located between The Bogs and The Roughs woodland was a foraging and commuting resource which connected a large area of potential roosting habitat within The Roughs and Sixteen Acre Wood. This area supported populations of two common bat species: common pipistrelle and soprano pipistrelle as well as rarer bat species such as *Myotis* sp. The latter species had a peak in registration of 1,088 during the May deployment, considerably higher in comparison with other study areas within the Balsall Common and Hampton-in-Arden area (CFA23).

### **Sixteen Acre Wood**

2.4.78 A summary of static detector monitoring results for 040-BA2-151015 are provided in Table 27.

2.4.79 A summary of static detector monitoring results for 040-BA2-151016 are provided in Table 28.

2.4.80 A summary of static detector monitoring results for 040-BA2-151017 are provided in Table 29.

Table 27: Summary of static detector monitoring results for 040-BA2-151015

Ecology survey code	Location	OS Grid		Description of habitat														
040-BA2-151015	Sixteen Acre Wood	SP23115 79520		Static detector located within mixed plantation woodland within Sixteen Acre Wood.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>63</sup>																
Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep		
04 July to 10 July 2013	7	84	370	-	36	-	-	-	-	50	-	-	3	-	-	1		

Table 28: Summary of static detector monitoring results for 040-BA2-151016

Ecology survey code	Location	OS Grid		Description of habitat														
040-BA2-151016	Sixteen Acre Wood	SP22882 79633		Static detector located within mixed plantation woodland on the border of Sixteen Acre Wood.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>64</sup>																
Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep		
04 July to 10 July 2013	7	8	129	-	15	-	-	-	-	22	1	-	-	-	-	2		

<sup>63</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>64</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 29: Summary of static detector monitoring results for 040-BA2-151017

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-151017	Sixteen Acre Wood	SP23027 29560	Static detector located within ancient and mixed plantation woodland, marsh/marshy grasslands within Sixteen Acre Wood.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>65</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
04 July to 09 July 2013	7	170	165	-	162	-	-	-	-	-	-	24	2	-	6	1	-	4

<sup>65</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.81 Sixteen Acre Wood lay to the southern boundary of Berkswell Marsh SSSI. Static recorder results demonstrated the use of this area by eight bat species including common pipistrelle, soprano pipistrelle, brown long-eared, noctule, and Leisler's bat. Individuals were also recorded representing Pipistrelle sp., *Myotis* sp. and *Nyctalus* sp.. Linear features such as watercourses and species rich hedgerows were present and afforded important connecting habitats linking the pond located between The Bogs and The Roughs woodland, Sixteen Acre Wood and Marlowes woodland, all of which provided high quality foraging, commuting and roosting habitats in their own right. This area contained a confirmed tree roost (040-BT3-151018), a confirmed building roost (040-BS3-150015), as well as a number of trees with high roost potential.

### **River Blythe SSSI**

2.4.82 A summary of static detector monitoring results for 040-BA2-153006 are provided in Table 30.

2.4.83 A summary of static detector monitoring results for 040-BA2-154002 are provided in Table 31.

Table 30: Summary of static detector monitoring results for 040-BA2-153006.

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-153006	Marsh Lane, Hampton-in-Arden	SP 21702 80799	Static detector located on the boundary of a tributary to the River Blythe SSSI and to the east of Marsh Lane Nature Reserve															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>66</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
27 April to 02 May 2013	6	210	485	-	158	-	-	-	-	-	-	2	-	-	58	42	30	44

Table 31: Summary of static detector monitoring results for 040-BA2-154002.

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-154002	River Blythe SSSI downstream of the A452 Kenilworth Road	SP 21899 81786	Static detector located on the River Blythe SSSI downstream of A452 Kenilworth Road Bridge - riparian habitat at this point is predominantly semi-improved grasslands and marsh/marshy grassland															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>67</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
18 July to 22 July 2013	7	810	1103	-	191	-	-	-	-	-	-	121	4	-	22	13	2	3

<sup>66</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>67</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.84 Static recorder 040-BA2-153006 was set out on the northern boundary of Marsh Lane Nature Reserve, within the riparian habitat of a small feeder stream to the River Blythe. This static recorder was located within the land required for the construction of the Proposed Scheme. A total of 1,029 bat passes were recorded during the April/May deployment. Of these 485 were attributed to soprano pipistrelle and 210 were of common pipistrelle. Rarer species such as serotine (30 passes), noctule (58 passes) and Leisler's bat (42 passes) were all recorded foraging and/or commuting along this feeder stream.

2.4.85 Static recorder 040-BA2-154002 was located north-east of the land required for the construction of the Proposed Scheme on the boundary of the River Blythe SSSI. Nine bat species including common pipistrelle, soprano pipistrelle, noctule, *Myotis* sp., Leisler's, serotine, *Nyctalus* sp. and brown long-eared bat were all recorded during activity surveys along or in the vicinity of the River Blythe SSSI. Five confirmed tree roosts were identified within the immediate vicinity of the River Blythe SSSI along with a large number of potential roost sites. Three confirmed building roosts were identified within Hampton-in-Arden, west of the River Blythe SSSI. Of the eight confirmed roosts, four were occupied by common pipistrelle, two were occupied by brown long-eared, and two were occupied by soprano pipistrelle.

### **Shadow Brook**

2.4.86 A summary of static detector monitoring results for 040-BA2-154003 are provided in Table 32.

2.4.87 A summary of static detector monitoring results for 040-BA2-155008 are provided in Table 33.

Table 32: Summary of static detector monitoring results for 040-BA2-154003

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-154003	Shadow Brook , east of Diddington Lane	SP 21460 82378	Static detector located within the semi-natural riparian habitat of Shadow Brook which is dominated by mature broadleaved species notably alder, willow and ash.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>68</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
25 July to 29 July 2013	5	818	10	-	10	-	-	-	-	-	-	1	-	-	-	-	-	3

Table 33: Summary of static detector monitoring results for 040-BA2-155008.

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-155008	Shadow Brook , west of Diddington Lane	SP 21112 82378	Static detector located within the semi-natural riparian habitat of Shadow Brook which is dominated by mature broadleaved species notably alder, willow and ash.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>69</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
18 July to 24 July 2013	7	461	111		3	-	-	-	-	-	-	22	2	-	2	-	-	3

<sup>68</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>69</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.88 The habitats north of River Blythe SSSI to the Shadow Brook included mainly arable and poor semi-improved grasslands. Shadow Brook flowed south to north through the land required for the construction of the Proposed Scheme and was surrounded by semi-natural riparian habitat consisting mainly of broadleaved woodland and scattered broadleaved trees.

2.4.89 Static recorders were strategically placed east and west of Diddington Lane along the riparian habitats adjacent to Shadow Brook, within the land required for the construction of the Proposed Scheme. Common and soprano pipistrelle were the dominant species recorded using this riparian corridor with occasional passes of *Myotis* sp. and *Nyctalus* sp.

2.4.90 Two confirmed roost sites were recorded in close proximity to this area. A common pipistrelle maternity roost was identified north of Shadow Brook at Diddington Hall (040-BS3-155072). A further common pipistrelle day roost and a brown long-eared day roost were identified at Pasture Farm (040-BS3-155039). The survey results identified Shadow Brook and its riparian habitats as being used extensively by common pipistrelle for foraging and commuting.

#### *Radio-tracking and bat trapping surveys*

2.4.91 Records of barbastelle were recorded from two locations: within the vicinity of the pond located between The Bogs and The Roughs woodland and also within Marlowes wood during the 2013 static detector deployment surveys.

2.4.92 The desk study records did not identify historical records for barbastelle within the study area.

2.4.93 Bat trapping and radio tracking surveys were proposed in July 2013 to provide more information on roosting, commuting and foraging behaviour of barbastelle and also to provide information on the dispersal of other bat species known to occur within the area. The aim of the targeted trapping and tracking surveys was to better understand the dispersal routes of barbastelle and other bat species at these locations.

2.4.94 The areas proposed for survey included the land to the east of A452 Kenilworth Road and the River Blythe SSSI, where a number of bat species have been recorded.

2.4.95 Access restrictions prevented bat trapping surveys being undertaken within the land east of A452 Kenilworth Road surrounding Berkswell Marsh SSSI and Berkswell Marsh Meadow Local Wildlife Site (LWS), a key area identified within this area as having potential to support rarer bat species such as barbastelle. This was a significant limitation to the proposed bat trapping and tracking surveys and indeed the overall assessment of barbastelle species within the study area.

2.4.96 Trapping surveys were undertaken along the River Blythe SSSI, where access allowed in late August 2013.

2.4.97 Two species were tagged during the survey and included a male brown long-eared and a male Daubenton's bat. Both bats were subsequently radio tracked to determine roost location, foraging location and flight lines between roosts and foraging sites.

2.4.98 The brown long-eared was radio tracked back to a roost site within a private residence on Diddington Lane (040-BS3-154082), and was also subsequently tracked to a night time roost at another private residence along Diddington Lane.

2.4.99 The Daubenton's bat was recorded roosting within a sycamore tree located within an area of mixed broadleaved woodland, located on Shadow Brook Lane, Hampton-in-Arden (West of Volume 5: Map EC-05-052-D10).

## Discussion

2.4.100 In total ten species of bat were recorded within the extent of the survey area. These included common pipistrelle, soprano pipistrelle, Natterer's, noctule, Leisler's bat, Daubenton's bat, serotine, and barbastelle. The genus *Myotis* sp. and *Pipistrelle* sp. were also recorded in abundance. A total of 24 roost sites were identified within this area, 13 of which were roosts in buildings or built features and 11 of which were tree roosts.

2.4.101 Desk study records did not identify any roost sites within the study area or up to 5km from the land required for the construction of the Proposed Scheme.

2.4.102 Habitats used extensively for commuting by bats within this area included the following:

- Kenilworth Greenway (040-BA6-148001);
- Bayleys Brook (040-BA6-149003);
- Marlowes wood (040-BA6-150002) and connecting wood to the north-east (040-BA6-151001);
- Sixteen Acre Wood, the pond located between The Bogs and The Roughs woodland and Bayleys Brook (040-BA6-149003);
- River Blythe SSSI (040-BA6-154001); and
- the riparian habitats of Shadow Brook (040-BA6-155001).

2.4.103 Bat commuting routes which were used less extensively included:

- Baulk Lane;
- the extent of woodland on the north side of Park Lane;
- hedgerows on Diddington Lane; and
- hedgerows between Pasture Farm and Shadow Brook.

2.4.104 Habitats identified as being used extensively for foraging by bats within this area included:

- the pond south of Beechwood Farm (040-BA5-148001);
- Bayleys Brook between Berkswell Marsh SSSI and Berkswell Station, the artificial ponds at Lavender Hall Fisheries and associated adjacent habitats

(040-BA5-149001);

- the pond located between The Bogs and The Roughs woodland and tributaries (040-BA5-150001);
- Marlowes wood (040-BA5-150002);
- the land surrounding Berkswell Marsh Meadow LWS (040-BA5-152001);
- Marsh Lane Nature Reserve (040-BA5-153001);
- woodland between River Blythe SSSI and B4102 Meriden Road (040-BA5-154001);
- Mouldings Green Farm Hampton-in-Arden LWS (040-BA5-154002); and
- the riparian habitats of Shadow Brook (040-BA5-155003).

2.4.105 Foraging routes used less extensively included the pond at Sixteen Acre Wood.

2.4.106 The woodland parcels and water bodies outlined above contained remnants of ancient woodland, as well as broad-leaved semi-natural woodland, broad-leaved plantation woodland, rides, tracks and numerous species rich hedgerows. These were likely to have contributed to the high levels of foraging and dispersal activity recorded within this area.

2.4.107 A number of confirmed roosts were located within the vicinity of the River Blythe SSSI. The River Blythe SSSI flowed west from the A452 Kenilworth Road through habitats predominantly represented by poor semi-improved and improved grasslands with pockets of semi-improved neutral grassland and semi-natural broadleaved woodland. It then flowed south outside of the land required for the construction of the Proposed Scheme, and west of Marsh Lane Nature Reserve and provides a link to key foraging, commuting and roosting habitats. Both serotine and Leisler's bat are considered to be rarer species<sup>70</sup> and their distributions in Warwickshire were known to be generally limited to the south of the county. Bat activity surveys identified Leisler's bat as present within the survey extent of this area, though mainly limited to the PRow area at Marsh Lane Nature Reserve where both transect and static recorder results returned a high number of registrations for this species. Lower levels of foraging and dispersal activity of Leisler's bat were recorded within Marlowes woodland. Serotine bats were similarly recorded within the area, though registrations rarely exceeded three passes at any one time in any one location, the exception being at land to the east of Lavender Hall Farm where over 200 passes were recorded during one transect survey.

2.4.108 Barbastelle bats are considered as one of the rarest of UK bat species<sup>71</sup> and their distribution in Warwickshire is considered limited to the south of the county. Barbastelles registrations were recorded at two locations including within Marlowes

<sup>70</sup> Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010). *Valuing Bats in Ecological Impact Assessment*. IEEM In-Practice.

<sup>71</sup> Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010). *Valuing Bats in Ecological Impact Assessment*. IEEM In-Practice.

woodland and The Bogs. Lack of access to key foraging and commuting habitats for this species and potential roosting habitat, prevented a detailed study of this species within this area during the 2013 survey season.

## Birmingham Interchange and Chelmsley Wood area (CFA24)

### *Roosting (Trees)*

2.4.109 All isolated mature stand-alone trees within 100m of the land required for the construction of the Proposed Scheme were evaluated for roost potential. All wooded areas were given an overall assessment of bat suitability based on the deviation outlined in Section 2.3.

2.4.110 Four woodland parcels were subject to the woodland assessment this area and included:

- the wood on the disused rail line, east of the A452 Chester Road;
- woodland located between the M42, M6 and the A446 Stonebridge Road;
- Coleshill Pool Wood LWS; and
- Coleshill & Bannerly Pools SSSI.

2.4.111 A total of 89 trees within this area were subject to initial bat scoping assessment for features of potential for use as roosts including loose bark, splits, cracks, woodpecker holes, knot holes and hollows.

2.4.112 Of the 89 trees initially assessed, 44 trees were regarded as being of low to negligible roost potential.

2.4.113 Tree climbing surveys were carried out on 40 trees, and identified five trees with high bat roost potential and 35 trees with moderate roost potential.

2.4.114 The remaining five trees were not subject to further detailed inspection as these trees were:

- considered unsafe to climb;
- covered in ivy; and/or
- held features that could be fully viewed from the ground using a torch.

2.4.115 Final assessments made subsequent to all scoping surveys within this area, identified a total of 14 trees as having high bat roost potential, and 31 trees as having moderate bat roost potential within this area (see Volume 5: Map series EC-05).

2.4.116 One confirmed bat roost identified was recorded supporting a single soprano pipistrelle (040-BT3-155085). It was also identified as being likely to be used as a day roost during the summer months. Soprano pipistrelle is a common bat species that is not threatened or rare in Warwickshire.

2.4.117 Backtracking surveys identified a second roost site within a mature oak within Coleshill & Bannerly Pools SSSI (040-BT3-158088), which supported two common

pipistrelles and four noctules. *Myotis* activity was also recorded within the vicinity of this roost, with individuals noted commuting predominantly east to west across the site.

2.4.118 The confirmed tree roosts identified within the Birmingham Interchange and Chelmsley Wood area (CFA24) are shown in Table 34, and outlined in Volume 5: Map series EC-05.

2.4.119 In addition to the confirmed tree roosts, the following potential tree roosts, where bats were seen but not confirmed emerging or re-entering, were recorded during the course of the surveys:

- a soprano pipistrelle roost in a mature oak on land east of the A452 Chester Road and south of Packington Lane (Volume 5: Map series EC-05-053-F4);
- a *Nyctalus* sp. roost within a mature oak located within the land east of A452 Chester Road and south of Packington Lane (Volume 5: Map series EC-05-053-F4);
- a *Myotis* sp. roost within a dead oak west of the A452 Chester Road and east of the M6 (Volume 5: Map series EC-05-053-D7); and
- a common pipistrelle roost within a mature oak south of Common Farm, immediately west of the A452 Chester Road (Volume 5: Map series EC-05-053-D7).

Table 34: Confirmed tree roosts within the Birmingham Interchange and Chelmsley Wood area (CFA24)

Ecology survey code	Location	OS grid reference	Tree species	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>72</sup> (m) and orientation
040-BT3-155085	Land at the junction of A452 Kenilworth Road and Birmingham Road	SP 21577 82969	Oak	soprano pipistrelle (1)	13th August 2013 emergence	Day roost	Oak with a 10cm cavity in trunk	24	40m, north-east
040-BT3-158088	Coleshill & Bannerly Pools SSSI	SP1996 985911	Oak	common pipistrelle (2) noctule (4)	10th July 2013 re-entry	Day roost	Oak with woodpecker hole	24	50m, north east

<sup>72</sup>The phrase 'Within land required' represents an abbreviation of this term

### *Roosting (building and structures)*

2.4.121 This study area had a total of 34 buildings within 100m of the land required for the construction of the Proposed Scheme. Each building was assessed in terms of its potential to support an active bat roost.

2.4.122 One roost was confirmed during initial scoping assessments within the study area, where a single dead bat, subsequently identified as *Pipistrelle* sp., was collected by the owner and passed to the surveyors. This was located at Common Farm, south of the A452 Chester Road (040-BS3-157071).

2.4.123 One building was inspected internally for the presence of bats; other buildings were not inspected internally due to the difficulties in obtaining home owner permission. In addition, safe site access was not always possible.

2.4.124 Final assessments which were made subsequent to all scoping surveys within this area identified a total of 10 buildings with a high bat roost potential and seven with moderate bat roost potential (see Volume 5: Map series EC-05). All structures of moderate to high roost potential were subject to emergence/re-entry surveys during the period April 2013 to August 2013.

2.4.125 Seventeen buildings were scoped out either due to having low to negligible roost potential, or due to there not being a safe means of site access.

2.4.126 No underground structures such as caves or mines were known to be present within the Birmingham Interchange and Chelmsley Wood area (CFA24).

2.4.127 Five confirmed building roosts were recorded within the study area. Common pipistrelle and brown long-eared were the only species recorded occupying these roosts and each was occupied by either single individuals or otherwise small numbers of individuals.

2.4.128 Of the five buildings or structures identified, all were confirmed as day roosts. However, there was potential for the Park Farm residential building (040-BS3-156051) to also be used as a hibernation site owing to the presence of cellar.

2.4.129 Roosts which were identified and confirmed within buildings and built structures in the Birmingham Interchange and Chelmsley Wood area (CFA24) are detailed in Table 35.

Table 35: Confirmed bat roosts in buildings/structures in the Birmingham Interchange and Chelmsley Wood area (CFA24)

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>73</sup> (m) and orientation
040-BS3-155073	Mill Farm Barns, north of A45 Birmingham Road and east of A452 Chester Road	SP 21622 83331	Restored barns dating back to the 1960's now used as office buildings During the restoration an artificial bat loft was installed.	brown long-eared (1) common pipistrelle (1)	13th August 2013 Emergence survey	Day roost	Roost located at the gable end of the roof.	24	160m, north-east
040-BS3-156048	Private residence located west of Middle Bickenhill Lane and north of Eastway.	SP 20269 83519	Two storey brick residential building	common pipistrelle (1)	9th September 2013 Re-entry survey	Day roost	Gaps beneath clay tiles	24	10m, south-west
040-BS3-156051	Park Farm, located west of A452 Chester Road and east of Diddington Lane	SP 20651 84044	Two storey listed farm building dating back to the middle of 18th century. The building is composed of Warwickshire brick and tiles and is surrounded by farm out houses converted into modern office facilities.	common pipistrelle (5)	31 May 2013 Re-entry survey	Day roost	Pitched roof building with a number of loose roof tiles, bats are likely to roosting within the roof space given emergence at three different point of the pitched roof and re-entry underneath the top of a window pane on the upper level of the house	24	20m, north-east
040-BS3-156052	Private residence located west of Middle Bickenhill	SP 20255 83508	Modern single storey residential house	common pipistrelle (2)	29 April 2013 Emergence survey	Day roost	Building contains gaps in several locations including beneath ridge tiles, underneath lead flashing,	24	10m, south-west

<sup>73</sup>The phrase 'Within land required' represents an abbreviation of this term

Ecology survey code	Location	OS grid reference	Building/ structure type	Species confirmed utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	CFA	Distance from land required for the construction of the Proposed Scheme <sup>73</sup> (m) and orientation
	Lane and north of Eastway.						underneath roof tiles and gaps between roofing felt and clay tiles. Common pipistrelle recorded emerging from ridge tile.		
040-BS3-157071	Common Farm	SP 20020 84926	One and two storey 'C' shaped brick building with a pitched roof	Pipistrelle sp. (1)	Dead bat found within roof space by owner	Day Roost	Clay roof tiles with gaps in several locations.	24	10m, east

## Bat activity surveys

2.4.130 The following bat species were recorded during the range of bat activity surveys (transects, backtracking, static recorder and radio tracking surveys) conducted within the Birmingham Interchange and Chelmsley Wood area (CFA24) to date:

- common pipistrelle;
- soprano pipistrelle;
- brown long-eared bat;
- noctule;
- Leisler's bat;
- serotine;
- *Myotis* sp. (including a confirmed *Myotis mystacinus*);
- Natterer's;
- Daubenton's bat; and
- barbastelle.

## Transect surveys

2.4.131 Transects carried out within the Birmingham Interchange and Chelmsley Wood area (CFA24) during 2012 are outlined in Table 36. Transect routes are presented in Volume 5: Map series EC-06 at a scale of 1:5,000.

Table 36: Transect surveys conducted within the Balsall Common and Hampton-in-Arden area (CFA24) during 2012

Ecology survey code	Transect location	Number of surveys conducted	First survey date	Final survey date	CFA	Map Reference
040-BA1-156009	Land north of Eastway, west of A452 Chester Road and east of M42	2	18 September 2012	04 October 2012	24	EC-06-106-F7

### Land north of Eastway, west of A452 Chester Road and east of M42

2.4.132 Bat Activity Transect results for 040-BA1-156009 are shown Table 37.

Table 37: Bat activity transect survey results - 040-BA1-156009

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>74</sup>																
	Temp (°C)	Cloud (0-8) <sup>75</sup>	Rain (0-5) <sup>76</sup>	Wind (0-12) <sup>77</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
Visit 1: 18 September 2012	10.0 (start) 8.2 (End)	4	0	2	14	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 2: 01 October 2012 and 02 October 2012	13.0 (start) 13.0 (End) 10.0 (start) 10.0 (End)	0 4	0 0	2 1	3 - - -	1 - - -	- - - -	2 - - -	- - - -												
Visit 3: 04 October 2012	14.1 (start) 11.4 (End)	8	0-3	2	24	6	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-

<sup>74</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>75</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>76</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>77</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.133 Three transect surveys of the land north of Eastway, west of A452 Chester Road and east of M42 were carried out in 2012. The majority of the passes were attributed to common pipistrelle which reached a peak in registrations of 24 during the 04 October 2012 transect. A single *Myotis* sp. pass was also recorded during this survey identified commuting along Hollywell Brook. Overall, bat activity was low during all three surveys.

2.4.134 Transects carried out within the Birmingham Interchange and Chelmsley Wood area (CFA24) during 2013 are outlined in Table 38. Transect routes are presented in Volume 5: Map series EC-06 at a scale of 1:5,000.

Table 38: Bat activity surveys conducted within the Birmingham Interchange and Chelmsley Wood area (CFA24) during 2013

Ecology survey code	Transect location	Number of surveys conducted	First survey date	Final survey date	CFA	Map Reference
040-BA1-156008	The wood east and west of the A452 Chester Road and south of Packington Lane	1 <sup>78</sup>	10 April 2013	10 April 2013	24	EC-06-106-H2
040-BA1-158012	East of Coleshill & Bannerly Pools SSSI	3	11 June 2013	15 July 2013	24	EC-06-107-F2
040-BA1-159009	Coleshill & Bannerly Pools SSSI	2	29 April 2013	31 May 2013	24	EC-06-107-E3
040-BA1-159011	Coleshill Pool Wood LWS and area north-west	2	16 April 2013	16 May 2013	24	EC-06-107-C6

### **The wood east and west of the A452 Chester Road and south of Packington Lane**

2.4.135 Bat Activity Transect results for 040-BA1-156008 are shown Table 39.

<sup>78</sup> Further activity surveys within this land parcel were prohibited as the excavation of the site in preparation for gravel extraction began in early 2013. Emergence/re-entry surveys continued within the buildings and woodland parcels to the far east of the site.

Table 39: Bat activity transect survey results - Transect o40-BA1-156008

Ecology survey code	Transect location				Description of habitats covered by transect																
o40-BA1-156008	The wood east and west of the A452 Chester Road and south of Packington Lane				This transect traversed a number of habitats including broadleaved woodland, which has established along a disused railway line and which is considered to be an opportune commuting corridor, marshy grassland, Hollywell Brook and arable lands.																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>79</sup>																
	Temp (°C)	Cloud (0-8) <sup>80</sup>	Rain (0-5) <sup>81</sup>	Wind (0-12) <sup>82</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 10 April 2013	10 (start) 9.2 (End)	8	0	2	28	1		33	-	-	-	-	-	-	-	-	-	-	-	1	-

<sup>79</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>80</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>81</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>82</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.136 Transect 040-BA1-156008 was undertaken at the wood which lies to both the east and west of the A452 Chester Road and south of Packington Lane. This transect was only conducted once owing to access constraints. Over 50 bat passes were recorded during the activity survey, with *Pipistrelle* sp. most frequently recorded foraging and commuting throughout the site. One serotine bat pass was also recorded.

### **East of Coleshill & Bannerly Pools SSSI**

2.4.137 Bat Activity Transect results for 040-BA1-158012 are shown Table 40.

Table 40: Bat activity transect survey results - Transect 040-BA1-158012.

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>83</sup>																
	Temp (°C)	Cloud (0-8) <sup>84</sup>	Rain (0-5) <sup>85</sup>	Wind (0-12) <sup>86</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 11 June 2013	11.2(start) 11.0 (End)	7	0	1	7+	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 2: 14 June 2013	10.1(start) 10.0 (End)	0	0	2	31	15	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 3: 15 July 2013	22.9 (start) 22.0 (End)	7	0	1	-	-	-	7	-	-	-	-	-	-	13	-	-	3	-	-	-

<sup>83</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>84</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>85</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>86</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.139 Transect 040-BA1-158012 incorporated land located to the east of Coleshill & Bannerly Pools SSSI, and was undertaken three times in 2013. Four species were identified during the activity surveys; common pipistrelle; soprano pipistrelle, *Myotis* sp. and noctule. Several *Pipistrelle* sp. were also recorded but these, as with the *Myotis* sp. records, could not be distinguished to the species level. Foraging was the main activity recorded, with the majority of individuals recorded using the southern extent of the site which was dominated by pockets of broadleaved woodland. The highest number of passes recorded was of common pipistrelle (31 during the replicate of the 14 June 2013).

### **Coleshill & Bannerly Pools SSSI**

2.4.140 Bat Activity Transect results for 040-BA1-159009 are shown in Table 41.

Table 41: Bat activity transect survey results - Transect o40-BA1-159009

Ecology survey code	Transect location				Description of habitats covered by transect																
o40-BA1-159009	Coleshill & Bannerly Pools SSSI				Semi-natural broadleaved woodland and fen which surrounded two large pools central to this land parcel.																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>87</sup>																
	Temp (°C)	Cloud (0-8) <sup>88</sup>	Rain (0-5) <sup>89</sup>	Wind (0-12) <sup>90</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep
Visit 1: 29 April 2013	9.4 (start) 8.5 (end)	8	3	2	7	2	-	1	-	-	-	-	-	-	2	1	-	-	-	-	-
Visit 2: 31 May 2013	14.2 (start) 4.5 (end)	8	0	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Visit 3: 04 June 2013	16 (start) 15 (end)	8	0	0	11	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<sup>87</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>88</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>89</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>90</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.141 Three transect surveys were undertaken at Coleshill Pools. Four bat species were identified during these surveys; common pipistrelle, soprano pipistrelle, *Myotis* sp. and brown long-eared. Individual passes of each species were significantly low during all three replicates with the highest peak number of passes being of 11 common pipistrelle, recorded on the 4th June 2013.

**Coleshill Pool Wood LWS and land to the north-west**

2.4.142 Bat Activity Transect results for 040-BA1-159011 are shown in Table 42.

Table 42: Bat activity transect survey results - Transect 040-BA1-159011

Ecology survey code	Transect location				Description of habitats covered by transect																
Visit number and date	Weather conditions				Total species passes during transect survey <sup>91</sup>																
	Temp (°C)	Cloud (0-8) <sup>92</sup>	Rain (0-5) <sup>93</sup>	Wind (0-12) <sup>94</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
Visit 1: 16 April 2013	12.0 (start) 12.0 (End)	2	0	2	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 2: 16 May 2013	11.1 (start) 9 (end)	8	3	1		-	-	7		-	-	-	-	-	-	-	-	-	-	-	-
Visit 3: 31 July 2013	15.3 (start) 16.0 (end)	8	0	2	5	-	--	36	-	-	-	-	-	-	-	-	-	-	-	-	2

<sup>91</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>92</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>93</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>94</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.143 Three transect surveys were undertaken at Coleshill Pool Wood LWS. Common pipistrelle was the only species recorded during the first transect survey, and *Pipistrelle* sp. was the only species recorded during the second transect survey. Activity during both transects was limited to less than 20 passes of each species. The dominant behaviour recorded was foraging, particularly around the pond located on the northern boundary of the woodland, to the south of the site, and along hedgerows connecting this pond to other hedgerows located in the north of the site.

2.4.144 Backtracking surveys were also undertaken in this area within the broadleaved woodland in the south of the site. These surveys were undertaken to determine the presence of potential roost sites. No roosts were identified and activity recorded in this area was limited to commuting and foraging pipistrelle species.

### *Static recorders*

2.4.145 A number of sites were identified close to features of potential value to bats and were subsequently surveyed using SM2BAT+ recorders placed in-situ for several days. The sites were chosen to provide survey coverage of the land required for the construction of the Proposed Scheme where route alignment could result in severance of potentially important foraging and commuting routes. These surveys were replicated throughout April to July 2013.

### **Land south of A45 Coventry Road**

2.4.146 A summary of static detector monitoring results for 040-BA2-155006 are provided in Table 43.

2.4.147 A summary of static detector monitoring results for 040-BA2-155007 are provided in Table 44. The detector placed out for 8 nights 19th - 26th July only recorded for 5 nights.

Table 43: Summary of static detector monitoring results for 040-BA2-155006

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-155006	Pasture Farm	SP 20834 83019	Static detector located within an area of semi-natural broadleaved woodland to the south of the A45 Coventry Road, on the boundary of Pasture farm, Nursery Cottages and Eaglebeam recycling plant.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>95</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
18 July to 24 July 2013	7	70	280	-	18	-	-	-	-	-		1	-	-	1	-	-	9

Table 44: Summary of static detector monitoring results for 040-BA2-155007

Ecology survey code	Location	OS Grid	Description of habitat															
040-BA2-155007	Pasture Farm	SP 20822 83004	Static detector located within an area of semi-natural broadleaved woodland to the south of the A45 Coventry Road, on the boundary of Pasture farm, Nursery Cottages and Eaglebeam recycling plant.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>96</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
19 July to 26 July 2013	8	34	174	-	7	-	-	-	-	-		-	-	-	11	-	-	3

<sup>95</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>96</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.149 The land south of A45 Coventry Road contained an area of semi-mature broadleaved woodland which fell within the extent of land required for the construction of the Proposed Scheme. Static recorder results from this land parcel for the month of July identified that it was used by several species with the dominant species recorded being soprano pipistrelle (with a peak in registrations of 280) and common pipistrelle (with a peak in registration of 70).

#### **Park Farm and Middle Bickenhill Lane**

2.4.150 A summary of static detector monitoring results for 040-BA2-156015 are provided in Table 45.

2.4.151 A summary of static detector monitoring results for 040-BA2-156016 are provided in Table 46.

Table 45: Summary of static detector monitoring results for 040-BA2-156015.

Ecology survey code	Location	OS Grid	Description of habitat																
040-BA2-156015	Area between Middle Bickenhill Lane and A452 Chester Road	SP 20675 83542	Static detector located within the riparian habitat of Hollywell Brook - at the proposed location for the Birmingham Interchange Station.																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed (Number of nights analysed)	Species peak night count during monthly monitoring <sup>97</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep	
23 July to 27 July 2013	5	5 <sup>1</sup>	312	-	3	-	-	-	-	-	-	1	-	-	3	-	-	2	

Table 46: Summary of static detector monitoring results for 040-BA2-156016.

Ecology survey code	Location	OS Grid	Description of habitat																
040-BA2-156016	Area between Middle Bickenhill Lane and A452 Chester Road	SP 20542 83635	Static detector located on the western boundary of the disused railway corridor (now dominated by semi-natural broadleaved woodland) and that of Hollywell Brook.																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>98</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	Nl	Es	Ny/Ep	
25 April to 29 April 2013	5	2	7	-	-	-	-	-	-	-	-	-	2	-		1	-	1	
20 May to 24 May 2013	5	5 <sup>2</sup>	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

<sup>97</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>98</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, Nl - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Ecology survey code	Location	OS Grid		Description of habitat															
040-BA2-156016	Area between Middle Bickenhill Lane and A452 Chester Road	SP 20542 83635		Static detector located on the western boundary of the disused railway corridor (now dominated by semi-natural broadleaved woodland) and that of Hollywell Brook.															
Date (night monitoring)	Number of nights	Species peak night count during monthly monitoring <sup>98</sup>																	
23 July to 29 July 2013	7	100	36	-	4	-	-	-	-	-	-	-	1	1	-	16	-	1	3

2.4.152 A total of eight species were identified using this area including the rarer serotine. Several *Pipistrelle* sp. were also recorded but, as with the *Myotis* sp. record, could not be distinguished to the species level. Common bat species such as common and soprano pipistrelle were noted to have peak registrations reaching over 300 passes. The results of the static recorder surveys confirmed that the riparian habitat of Hollywell Brook and that of the dismantled railway line were used as foraging and commuting routes for both pipistrelle species.

### **Coleshill Pool Wood LWS and Brickfield Farm**

2.4.153 A summary of static detector monitoring results for 040-BA2-158001 are provided in Table 47.

2.4.154 A summary of static detector monitoring results for 040-BA2-159020 are provided in Table 48.

2.4.155 A summary of static detector monitoring results for 040-BA2-159021 are provided in Table 49. The detector placed out for 8 nights 20th - 27th May only recorded for 5 nights.

2.4.156 A summary of static detector monitoring results for 040-BA2-159024 are provided in Table 50.

Table 47: Summary of static detector monitoring results for 040-BA2-158001

Ecology survey code	Location	OS Grid		Description of habitat														
040-BA2-158001	Coleshill Pool Wood LWS	SP19661 85777		Static detector located in predominantly arable land with a pocket of semi-natural broadleaved woodland to the south east of the site. Static detector was located on the northern edge of the semi-natural broadleaved woodland, to the east of the proposed scheme.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>99</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
20 July to 26 July 2013	7	150	4		39	-	-	-	-	-	-	2	-	-	7	-	-	3

Table 48: Summary of static detector monitoring results for 040-BA2-159020

Ecology survey code	Location	OS Grid		Description of habitat														
040-BA2-159020	Coleshill Pool Wood LWS	SP19566 85757		Static detector located in predominantly arable land with a pocket of semi-natural broadleaved woodland to the south east of the site. Static detector was located on the northern edge of the semi-natural broadleaved woodland, to the west of the proposed scheme.														
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>100</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
11-14 July, 18-20 July 2013	7	84	17	-	2	-	-	-	-	-	-	3	-	-	-	-	-	1

<sup>99</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>100</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 49: Summary of static detector monitoring results for 040-BA2-159021

Ecology survey code	Location	OS Grid		Description of habitat															
040-BA2-159021	Coleshill Pool Wood LWS	SP 19725 85626		Static detector located in predominantly arable land with a pocket of semi-natural broadleaved woodland to the south east of the site. Static detector was located within the woodland to the eastern edge where there were a number of mature oaks, holly and other mature broadleaved trees.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>101</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
26 April to 02 May 2013	7	10	-	15	-	-	-	-	-	-	-	-	-	-	6	-	-	1	
20 May to 27 May 2013	8	150	7	-	30	-	-	-	-	-	-	-	-	-	2	-	-	-	

<sup>101</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 50: Summary of static detector monitoring results for 040-BA2-159024

Ecology survey code	Location	OS Grid		Description of habitat															
040-BA2-159024	Land north-west of Coleshill Pool Wood LWS	SP 19092 86235		Static detector located in predominantly arable land with a pocket of semi-natural broadleaved woodland to the south east of the site. Static detector was located on hedge which forms a linear corridor between the ponds present on site and that of the semi-natural broadleaved woodland.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>102</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
27 April to 03 May 2013	7	5	1	-	-	-	-	-	-	-	-	-	-	-	6	-	-	1	
20 May to 26 May 2013	7	55	25	-	13	-	-	-	-	-	-	-	-	-	36	-	-	2	

<sup>102</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.157 A total of four static detectors were deployed within the land parcel of Coleshill Pool Wood LWS, either side of the proposed route.

2.4.158 A total of six bat species were recorded using this area, including common and soprano pipistrelle, *Pipistrelle* sp., *Myotis* sp., noctule, and *Nyctalus* sp. Common pipistrelle registrations were most frequent with over 150 common pipistrelle passes recorded during the May and July survey replicates. The rarer species were recorded at lower levels (13 passes or less).

### **Coleshill & Bannerly Pools SSSI**

2.4.159 A summary of static detector monitoring results for 040-BA2-159022 are provided in Table 51.

2.4.160 A summary of static detector monitoring results for 040-BA2-159023 are provided in Table 52. The detector placed out for 7 nights 10th - 16th May only recorded for 3.5 nights.

Table 51: Summary of static detector monitoring results for 040-BA2-159022

Ecology survey code	Location	OS Grid	Description of habitat																	
040-BA2-159022	Coleshill & Bannerly Pools SSSI	SP 19871 86374	Static detector was located on the northern boundary of the northern pond where semi-mature broadleaved woodland borders semi-improved grassland. This land parcel was dominated by semi-natural broadleaved woodland.																	
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>103</sup>																		
10 May to 13 May 2013	7	50	190	-	1	-	-	-	-	-	-	-	-	2	-	-	15	-	-	2

Table 52: Summary of static detector monitoring results for 040-BA2-159023

Ecology survey code	Location	OS Grid	Description of habitat																	
040-BA2-159023	Coleshill & Bannerly Pools SSSI	SP 19825 86021	Static detector was located on the northern boundary of the southern pond. This land parcel was dominated by semi-natural broadleaved woodland.																	
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>104</sup>																		
10 May to 16 May 2013	7	6	1	-	7	-	-	-	-	-	-	-	-	4	-	2	5	-	1	1

<sup>103</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - *Nathusius' pipistrelle*, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - *Myotis* bat species, Pa - brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - *Nyctalus/ Eptesicus* bat.

<sup>104</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - *Nathusius' pipistrelle*, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - *Myotis* bat species, Pa - brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - *Nyctalus/ Eptesicus* bat.

2.4.161 Coleshill & Bannerly Pool SSSI is located to the east of Coleshill Pool Wood LWS. Seven bat species were recorded using this site. A total of 190 soprano pipistrelle foraging or commuting passes were recorded during the May 2013 survey replicate which was undertaken at the northern periphery of the site. Rarer species were recorded in much lower abundance and included *Myotis* sp., noctule and *Nyctalus* sp.

2.4.162 Barbastelle bats were considered as one of the rarest of UK bat species and their distribution in Warwickshire was considered limited to the south of the county. Two registrations of barbastelle bat were recorded at the northern boundary of the southern pond. A single registration of a serotine was also recorded. This species was considered to be of note within North Warwickshire.

2.4.163 Potential commuting routes were identified mainly between the Coleshill Pool area and the land to the east of A446 Stonebridge Road. The area east of the A446 Stonebridge Road contains access tracks and woodland edges which form linear connections with a wider extent of habitats located within the land further east, which were likely to be of greater value to bats. The area east of the A446 Stonebridge Road forms part of the Coleshill & Bannerly Pools SSSI and provided a variety of high value foraging habitats due to the complex mosaic of semi-natural broadleaved woodland, fen valley mire, species rich semi-improved grassland and standing water.

### *Radio-tracking and bat trapping surveys*

2.4.164 Bat trapping and radio tracking surveys were initiated in August 2013 to provide more information on roosting, commuting and foraging behaviour of barbastelle and other bat species in the areas of Coleshill & Bannerly Pools SSSI and within the area east of the A446 Stonebridge Road. These surveys were proposed to better understand use of the area by bats, particularly barbastelle.

2.4.165 Eight species were recorded during the trapping surveys within this area, including Leisler's bat, noctule, brown long-eared, whiskered bat, Daubenton's bat, Natterer's, common pipistrelle and soprano pipistrelle. Three species were selected for radio tagging. These were: Leisler's bat, noctule and Natterer's bat. Where possible, all three species were radio tracked in order to determine roost location, foraging location and flight lines between roost location and foraging sites.

2.4.166 The noctule was recorded foraging and commuting around the Coleshill & Bannerly Pools SSSI and over the A446 Stonebridge Road.

2.4.167 The Natterer's bat was radio-tracked to the area east of Coleshill & Bannerly Pools SSSI during daytime surveys. However, access restrictions to the site prevented further investigation.

2.4.168 No roosting sites were identified from the tracking of radio tagged individuals within this study area.

### **Discussion**

2.4.169 A total of ten bat species were recorded within the survey extent of the Birmingham Interchange and Chelmsley Wood area (CFA24). These were common pipistrelle,

soprano pipistrelle, Natterer's, noctule, Leisler's bat, serotine, brown long-eared, Daubenton's bat, barbastelle and whiskered bat. The genus *Myotis* sp. and *Pipistrelle* sp. were also recorded.

2.4.170 A total of seven roost sites were identified within this area. The two tree roosts were located less than 60m from the land required for the construction of the Proposed Scheme. Five building roosts were identified: four were within 20m of the land required for the construction of the Proposed Scheme, and the final roost was located 160m from the land required for the construction of the Proposed Scheme.

2.4.171 Desk study records did not identify any roosts within the study area or up to 5km from the land required for the construction of the Proposed Scheme.

2.4.172 The results of habitat assessment and activity surveys within this area showed that it had high quality foraging and commuting habitat. The mosaic of pasture and arable land with mature broadleaved shelterbelts and woodland areas adjacent to Hollywell Brook and Coleshill & Bannerly Pools SSSI supported a number of bat species including common pipistrelle, soprano pipistrelle, Natterer's, Leisler's bat, noctule, serotine, brown long-eared and *Myotis* sp., most of which were recorded in low abundance. Hollywell Brook provided a commuting and foraging resource connecting habitats upstream and downstream of Park Farm and Middle Bickenhill Lane.

2.4.173 Identified commuting routes within this area included:

- the dismantled railway line west of A45 Coventry Road (040-BA6-156001);
- Hollywell Brook ( 040-BA6-156002 and 040-BA6-156004);
- the dismantled railway line east of A452 Chester Road (040-BA6-156003); and
- between Coleshill Pool and Bannerly Pool and the land east of the A446 Stonebridge Road (040-BA6-159001).

2.4.174 Commuting routes where bats were recorded in smaller numbers along tree lines and other linear features were identified within the areas of Brickfield Farm and Common Farm as well to the west of Park Farm/Stonebridge Quarry.

2.4.175 Foraging routes were recorded along the riparian habitats of Hollywell Brook and woodland edge habitats at the wood along the dismantled railway (040-BA5-156001) and Coleshill & Bannerly Pools SSSI (040-BA5-158001).

2.4.176 Foraging areas were also recorded in the vicinity of water bodies within the land north of Coleshill Pool Wood LWS, and south of the Hollywell Brook where it flowed to the south of the A452 Chester Road.

2.4.177 All four confirmed building roosts within the survey extent of this section were occupied by *Pipistrelle* sp., with one also occupied by brown long-eared bat. Confirmed tree roosts were occupied by soprano pipistrelle, common pipistrelle and noctule.

2.4.178 Three species of *Myotis* bat were confirmed present within the area and included Natterer's bat, Daubenton's bat and whiskered bat, the latter being identified during trapping surveys at Coleshill & Bannerly Pools SSSI. The genus *Myotis* was encountered throughout the Birmingham Interchange and Chelmsley Wood area (CFA24) albeit in low abundance in a number of locations.

2.4.179 Records of brown long-eared, serotine, Leisler's bat and noctule were all in low abundance with only single registrations of some species being recorded on static detectors or during transect surveys. No specific areas were identified as strongholds for any of these species within the area.

2.4.180 Barbastelle were recorded at Coleshill & Bannerly Pool SSSI in a May 2013 static detector deployment survey. Ideal habitat for this species includes large blocks of deciduous woodland or pastoral landscapes with wet meadows and water bodies, all of which exist to a greater extent within the mosaic of habitat types present in the wider landscape, east of the A446 Stonebridge Road. Barbastelle were not located during the trapping surveys within the areas of Coleshill & Bannerly Pool SSSI or east of the A446 Stonebridge Road during the 2013 survey season.

## Castle Bromwich and Bromford area (CFA25)

### *Roosting (Trees)*

2.4.181 All isolated mature stand-alone trees within 100m of the land required for the construction of the Proposed Scheme were evaluated for roost potential. All wooded areas were given an overall assessment of bat suitability based on the deviation outlined in Section 2.3.

2.4.182 Three woodland parcels were subject to the woodland assessment within this area and included:

- Parkhall Wood, the wood to the east of Park Hall Site of Importance for Nature conservation (SINC);
- Parkhill Wood, the wood to the west of Park Hall SINC; and
- Langley Hill Wood, the wood west of the Park Hall SINC.

2.4.183 Following realignment of the land required for the construction of the Proposed Scheme in late December 2012 and January 2013, trees of moderate potential located within the area of Bromford Drive and east of Castle Bromwich Business Park were scoped out as their location lay outside the area required.

2.4.184 Final assessments which were made subsequent to all scoping surveys within this area identified a total of four trees as having a high bat roost potential, and three trees were identified as having moderate bat roost potential (see Volume 5: Map series EC-05).

2.4.185 No tree roosts were identified within this area during the 2012 and 2013 surveys. No previous roost sites were known within this area from desk study records.

### *Roosting (building and structures)*

2.4.186 This study area is heavily urbanised. Therefore initial assessment of the potential of buildings and structures to support bat roosts was limited to the area required for the construction of the Proposed Scheme. A total of eight buildings and/or structures were assessed.

2.4.187 Final assessments which were made subsequent to all scoping surveys within this area identified one railway structure as having moderate bat roost potential. No buildings were identified as having high bat roost potential (see Volume 5: Map series EC-05). The railway structure with moderate bat roost potential was subject to emergence/re-entry surveys during the period between May to June 2013. No confirmed roosts were identified within this structure.

### **Bat activity surveys**

2.4.188 The following bat species were recorded during the bat activity surveys conducted within the Castle Bromwich and Bromford area (CFA25). These were:

- common pipistrelle;
- soprano pipistrelle;
- brown long-eared bat;
- noctule;
- Leisler's bat;
- serotine; and
- *Myotis* sp.

### *Transect surveys*

2.4.189 Transect surveys carried out within the Castle Bromwich and Bromford area (CFA25) are outlined in Table 53. Transect routes are presented in Volume 5: Map series EC-06 at a scale of 1:5,000.

Table 53: Bat activity surveys conducted within the Castle Bromwich and Bromford area (CFA25)

Ecology survey code	Transect location	Number of surveys conducted	First survey date	Final survey date	CFA	Map Reference
040-BA1-166010	Park Hall SINC	3	15-04-2013	12 August 2013	25	EC-06 -135-E6

2.4.190 Bat Activity Transect results for 040-BA1-166010 are shown in Table 54.

Table 54: Bat activity transect survey results - Transect 040-BA1-166010

Ecology survey code	Transect location				Description of habitats covered by transect																	
Visit number and date	Weather conditions				Total species passes during transect survey <sup>105</sup>																	
	Temp (°C)	Cloud (0-8) <sup>106</sup>	Rain (0-5) <sup>107</sup>	Wind (0-12) <sup>108</sup>	Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
Visit 1: 15th April 2013	14.2 (start) 12 (end)	2	0	3	Greater than 13	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Visit 2: 10th May 2013	9.1 (start) 8.6 (end)	8	0	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Visit 3: 24th July 2013	20 (start) 17 (end)	6	0	0	26	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<sup>105</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>106</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>107</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>108</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane

2.4.192 Transect 040-BA1-166010 at Park Hall SINC was conducted three times in 2013. Bat activity was limited within Parkhall wood and concentrated in the far east of the site due to access constraints on the live railway. This woodland parcel had been managed in the recent past and provided sub-optimal habitat when compared with that of Langley wood and Parkhill wood. Common pipistrelle was the dominant species recorded with a peak count of 26 passes during the third activity survey.

### *Static surveys*

2.4.193 A number of sites were identified close to features of potential value to bats and were subsequently surveyed using SM2BAT+ recorders placed in-situ for seven days. These surveys were replicated throughout the period April to July 2013.

### **Park Hall SINC**

2.4.194 Four static bat recorders were placed within Park Hall SINC at the following locations:

- at the bridge over the River Tame SLINC (040-BA2-165003);
- to the western edge of Parkhill Wood (040-BA2-165019);
- to the western edge of Langley Hill Wood (040-BA2-166018); and
- between the semi-natural broadleaved woodland, marshy grassland and the main pond in the western section of Park Hall SINC (040-BA2-165020).

2.4.195 A total of nine bat species were recorded foraging and/or commuting within Park Hall SINC during the course of these surveys, with the dominant species being common pipistrelle, with a peak count of 1,303 registrations recorded in Park Hall SINC. Other species recorded included soprano pipistrelle, *Pipistrelle* sp., *Myotis* sp., noctule, Leisler's bat, brown long-eared, serotine and *Nyctalus* sp.

2.4.196 A summary of static detector monitoring results for 040-BA2-166018 are provided in Table 55.

2.4.197 A summary of static detector monitoring results for 040-BA2-165003 are provided in Table 56. The detector placed out for 8 nights 20th - 27th May only recorded for 5 nights.

2.4.198 A summary of static detector monitoring results for 040-BA2-165019 are provided in Table 57.

2.4.199 A summary of static detector monitoring results for 040-BA2-165020 are provided in Table 58. The detector placed out for 9 nights 23rd - 31st July only recorded for 5 nights.

Table 55: Summary of static detector monitoring results for o40-BA2-166018

Ecology survey code	Location	OS Grid		Description of habitat															
o40-BA2-166018	Park Hall SINC (Parkhill Wood)	SP 15518 90737		Static detector was located within a stand of broadleaved woodland located on the south side of the reserve with the M6 motorway bordering the southern aspect of the woodland. Habitats to the immediate north of the static include standing water, marsh/marshy grassland.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>109</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
23 April to 29 April 2013	7	221	4	-	20	-	-	-	-	-	-	1	1	-	1	12	2	1	
20 May to 26 May 2013	7	198	8	-	8	-	-	-	-	-	-	-	-	-	-	4	-	1	
23 July to 02 August 2013	5	354	13	-	-	-	-	-	-	-	-	-	-	-	-	3	55	-	126

<sup>109</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp. - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 56: Summary of static detector monitoring results for 040-BA2-165003

Ecology survey code	Location	OS Grid	Description of habitat																
040-BA2-165003	Park Hall SINC (Bridge over the River Tame SLINC)	SP 15903 90972	Static detector was located on a bridge over the River Tame SLINC - located to the north of Park Hall SINC																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>110</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
25 April to 29 April 2013	5	75	1	-	12	-	-	-	-	-	-	9	1	-	-	-	-	1	
20 May to 27 May 2013	8	545	45	-	16	-	-	-	-	-	-	57	-	-	6	11	-	7	

Table 57: Summary of static detector monitoring results for 040-BA2-165019

Ecology survey code	Location	OS Grid	Description of habitat																
040-BA2-165019	Park Hall SINC (Parkhall Wood)	SP 16312 90978	Static detector was located on edge of broadleaved woodland																
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed	Species peak night count during monthly monitoring <sup>111</sup>																	
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep	
25 April to 30 April 2013	5	75	1	-	12	-	-	-	-	-	-	9	1	-	-	-	-	1	
20 May to 27 May 2013	7	545	45	-	16	-	-	-	-	-	-	57	-	-	6	11	-	7	
28 July to 03 August 2013	7	49	14	-	2	-	-	-	-	-	-	2	1	-	10	12	1	20	

<sup>110</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

<sup>111</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

Table 58: Summary of static detector monitoring results for o40-BA2-165020

Ecology survey code	Location	OS Grid	Description of habitat															
o40-BA2-165020	Park Hall SINC	SP 15803 90835	Static detector was located between the edge of semi-natural broadleaved woodland, marsh/marshy grassland and that of the main pond.															
Date (night monitoring commenced to night monitoring ceased)	Number of nights detector deployed (Number of nights analysed)	Species peak night count during monthly monitoring <sup>112</sup>																
		Pp	Ppy	Pn	P sp.	Mb	Md	Mn	Mm	Mbr	Mm/Mb	M sp.	Pa	Bb	Nn	NI	Es	Ny/Ep
23 July to 31 July 2013	9 (5)	1303	27	-	-	-	-	-	-		-	-	-	-	19	31	-	70

<sup>112</sup> Pp - common pipistrelle, P py - soprano pipistrelle, Pn - Nathusius' pipistrelle, P sp. - Pipistrelle bat species, Mb - Bechstein's bat, Md - Daubenton's bat, Mn - Natterer's bat, Mm - whiskered bat, Mbr - Brandt's bat, Mm/Mb - whiskered/ Brandt's bat, M sp - Myotis bat species, Pa -brown long-eared bat, Bb - barbastelle bat, Nn - noctule bat, NI - Leisler's bat, Es - serotine bat, Ny/Ep - Nyctalus/ Eptesicus bat.

2.4.200 Key areas for potential roosts were identified from the results of the scoping and static detector surveys and were subject to emergence and re-entry surveys during the period between April and July 2013. No confirmed roosts were identified within Park Hall SINC. Back-tracking surveys within the woodland in Park Hall SINC were not possible due to the steep vertical slopes.

## Discussion

2.4.201 The Castle Bromwich and Bromford area (CFA25) is predominantly urbanised with the exception of Park Hall SINC to the eastern boundary of the area. The urbanised habitats within and adjacent to the land required for the construction of the Proposed Scheme were limited both in terms of roosting, foraging and commuting potential. In addition, in areas where bat potential was identified, safe site access was not always possible, resulting in a limited number of surveys being undertaken.

2.4.202 Desk study records did not identify any roosts within the study area or up to 5km from the land required for the construction of the Proposed Scheme.

2.4.203 The static detector and transect survey results demonstrated that Park Hall SINC supported a moderate population of both common pipistrelle. This species is not threatened or rare in the Warwickshire region but the complex of habitats present at Park Hall SINC provides good quality foraging habitat.

2.4.204 Lower numbers of soprano pipistrelle, *Myotis sp.*, noctule, Leisler's bat, brown long-eared bat, serotine and *Nyctalus sp.* were also recorded at Park Hall SINC.

2.4.205 The River Tame SLINC was identified as a key commuting and foraging corridor as were the woodland edge habitats of both Parkhall wood and Parkhill wood (040-BA5-165001 and 040-BA5-166001). These linear dispersal corridors along the base of the wooded embankment provided connectivity with foraging habitats along the River Tame SLINC and across the grassland habitats within the nature reserve itself for the local common pipistrelle population.

## Washwood Heath to Curzon Street area (CFA26)

### *Roosting (Trees)*

2.4.206 No trees were identified within this area as having a high bat roost potential. One tree within Birmingham city was identified as having medium bat roost potential (see Volume 5: Map series EC-05).

### *Roosting (Buildings and built structures)*

2.4.207 This study area has 316 buildings within the land required for the construction of the Proposed Scheme. In areas where bat potential was identified, safe site access was not always possible, resulting in a limited number of surveys being undertaken. Twenty-seven buildings/built structures were assessed in terms of potential to support active bat roosts with the following results:

- two buildings/structures were identified as having moderate bat roost potential; a private residence on Common Lane and a derelict public house located on the corner of Freeman Street and Park Street. No buildings were identified as having high bat roost potential (see Volume 5: Map series EC-05).

- a railway bridge located under Lawley Middleway on the A4540 was initially assessed as having moderate roost potential but was downgraded to low potential following detailed inspection.

2.4.208 Two private residences at Common Lane were subject to emergence/re-entry surveys during the period between April and May 2013. No roosts were identified. Bat activity was limited to commuting common pipistrelle to the north of both houses.

### *Transect surveys*

2.4.209 Based on Phase 1 Habitat Survey results, desk study records, and aerial photographs, scoping surveys from PRoW and adjacent areas of land access, no suitable habitats were identified within the study area where transect surveys could be undertaken.

### *Static surveys*

2.4.210 Lack of access and concerns over equipment security resulted in no static detectors being deployed within this area.

## **Discussion**

2.4.211 Desk study results sourced from Birmingham Wildlife Trust recorded no roost within 5km of the study area. Soprano pipistrelle and Daubenton's bat were recorded as being present within 5km of the land required for the construction of the Proposed Scheme within this area.

2.4.212 The network of canals and vegetated rail corridors, in addition to areas of parkland, all had the potential to provide foraging and commuting routes for common species, most notably common and soprano pipistrelle. However, owing to the lack of connectivity with habitats across the wider area, it was considered unlikely that any rarer species occurred in abundance within this area.

## 3 Otter

### 3.1 Introduction

3.1.1 This section of the appendix presents details of baseline information relating to otter (*Lutra lutra*) for the section of the Proposed Scheme that will pass through CFA23, CFA24, CFA25 and CFA26 inclusive.

### 3.2 Methodology

3.2.1 Details of the standard methodology used for otter surveys are provided in Ecology technical note: Ecological field survey methods and standards (Volume 5: Appendix CT-001-000/2).

3.2.2 Records of otter were received from the following sources:

- Warwickshire Biological Records Centre;<sup>113</sup>
- EcoRecord;<sup>114</sup>
- Warwickshire County Otter Recorder;
- Birmingham and the Black Country Wildlife Trust; and
- Environment Agency.

3.2.3 Table 59 lists the watercourses and water bodies identified for and subject to otter survey. In addition to this, all accessible stretches of watercourse within 2km of the land required for the construction of the Proposed Scheme were subject to spot checks (brief inspections of potentially suitable sites) for signs of otter.

Table 59: Summary of watercourses subject to otter survey

Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
EC-11-100b-C5 EC-11-100b-C6	A tributary to Bayleys Brook	Stream	SP 25440 77245- SP 25308 77082	Full	22 May 2012; 26 June 2012; 11 September 2012; 2 May 2013	23	Within land required
EC-11-100b-C7 - EC-11-100b-C8	A tributary to Bayleys	Stream	SP 25595 76805 - SP25176 77033	Full	03 August 2012; 16 August	23	Within land required

<sup>113</sup> Warwickshire Biological Records Centre; Warwickshire Museum; <http://heritage.warwickshire.gov.uk/ecology/data-and-ecological-records/warwickshire-biological-records-centre/>; accessed April 2012

<sup>114</sup> EcoRecord is the biological record centre for Birmingham and the Black Country (Dudley, Sandwell, Walsall & Wolverhampton). EcoRecord; The Ecological Database for Birmingham and the Black Country; <http://www.ecorecord.org.uk/?q=home>; contacted April 2012.

<sup>115</sup>The phrase 'Within land required' represents an abbreviation of this term

Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
	Brook				2012; 25 February 2012; 16 April 2013		
EC-11-101-E5 - EC-11-101-D6	A tributary to Bayleys Brook	Stream	SP 24578 77891 - SP 24414 77920	Full	07 September 2012; 27 September 2012; 06 February 2013; 18 March 2013	23	10m, north-east
EC-11-101-B3- EC-11-101-A5	A tributary to Bayleys Brook	Stream	SP 24147 78375 - SP 24410 78466	Full	06 February 2013; 18 March 2013; 10 April 2013; 10 May 2013	23	Within land required
EC-11-102-I5- EC-11-102-H4 EC-11-103-G6- EC-11-103-C10 040-0t2-153001	Bayleys Brook (a tributary to the River Blythe)	Stream	SP 24937 76956 - SP 24057 78693 and SP 22723 79786 - SP 21798 80278	Majority	18 June 2012; 03 August 2012; 16 August 2012; 06 September 2012; 07 September 2012; 27 September 2012; 04 October 2012; 17 October 2012; 17 January 2013; 06 February 2013; 07 February 2013; 13 February 2013; 18 March 2013; 25 March 2013; 10 April 2013; 10 May 2013;	23	Within land required

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Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
					30 May 2013		
EC-11-104-H8- EC- 11-104-F4	Horn Brook (a tributary to the River Blythe)	Stream	SP 21552 80846 - SP 21893 81518	Majority	22 August 2012; 06 September 2012; 19 September 2012; 04 October 2012; 07 February 2013; 13 February 2012; 25 March 2013; 28 March 2013; 01 May 2013;	23	Within land required
EC-11-104-G3- EC- 11-104-G1	Horn Brook (a tributary to the River Blythe)	Stream	SP 22551 81311- SP 22192 81245	Majority	20 May 2013; 13 June 2013	23	Within land required
EC-11-104-G9- EC- 11-104-F7	A tributary to Bayleys Brook	Stream	SP 21375 81027 - SP 21487 81293	Full	22 August 2012; 19 September 2013; 28 March 2013; 01 May 2013	23	Within land required
EC-11-104-H9- EC- 11-104-C1	River Blythe	Main River	SP 21515 80717 - SP 22014 82039	Majority	25 July 2012; 06 August 2012; 22 August 2012; 19 September 2012; 11 October 2012; 19 March 2013; 28 March 2013; 10 April 2013; 01 May 2013; 28 May 2013; 30 May 2013	23	Within land required

Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
EC-11-104-C1- EC-11-105b-E2	River Blythe and small tributaries	Main River	SP 22324 82120 - SP 21439 83070	Moderate	20 May 2013; 13 June 2013	23	Within land required
EC-11-104-D5- EC-11-104-D6	A tributary to River Blythe	Stream	SP 21502 81709 - SP 21647 81698	Majority	19 March 2013; 10 April 2013; 01 May 2013; 28 May 2013	23	10m, north-east
EC-11-105b-H2- EC-11-105b-G8	Shadow Brook	Stream	SP 21598 82527 - SP 20640 82245	Moderate	06 August 2012; 28 August 2012; 13 September 2012; 19 September 2012; 13 February 2013; 28 March 2013; 15 May 2013	23	Within land required
EC-11-100b-C6	Beechwood Farm Pond	Pond	SP 25299 77119	Majority	22 May 2012; 26 June 2012; 11 September 2012; 2 May 2013	23	Within land required
EC-11-101-E7- EC-11-101-C7	Lavender Hall Fisheries	Pond	SP 24362 77763	Majority	18 June 2012; 07 September 2012; 27 September 2012; 06 February 2012	23	50m, south-west
EC-11-102-l3	Lavender Hall Lane wooded ponds	Pond	SP 24209 78581	Full	17 January 2013; 06 February 2013; 18 March 2013; 25 March 2013; 10 April 2013; 10 May 2013; 28 May 2013	23	10m, north-east
EC-11-101-D6 040-OT2-149002	Ponds to the north of Moat	Pond	SP 2439077965; SP 24457 78311	Majority	07 September 2012; 27 September	23	Within land required

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Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
EC-11-101-C3	House Farm				2012; 06 February 2013; 18 March 2013; 10 April 2013		
EC-11-104-H7	Pond at Marsh Lane Nature Reserve	Pond	SP 21778 80812	Full	06 September 2012; 04 October 2012; 07 February 2013; 13 March 2013	23	30m, south-west
EC-11-104-C7 040-OT2-154001	Mouldings Green Farm, Hampton-in-Arden Local Wildlife Site (LWS)	Pond	SP 21444 81740	Full	25 July 2012; 06 August 2012; 11 October 2012; 19 March 2013	23	Within land required
EC-11-105a-E8	Ponds south of Pasture Farm	Pond	SP 20758 82708	Majority	06 August 2012; 28 August 2012; 13 September 2012; 19 September 2012; 13 February 2013	23	90m, south-west
EC-11-105b-E1	Pond south of A45 Birmingham Road and east of A452 Kenilworth Road	Pond	SP 21542 83077	Moderate	18 February 2013; 19 April 2013; 10 May 2013; 03 June 2013	23	20m, north-east
EC-11-104-G1	Horn Brook Pond	Pond	SP 22263 81396	Majority	20 May 2013; 13 June 2013	23	10m, north-east
EC-11-105b-E2- EC-11-105b-C1	River Blythe	Main River	SP 21397 83198 - SP 21390 83507	Full	20 May 2013; 13 June 2013	24	Within land required
EC-11-105b-C6- EC-	Tributary to Hollywell	Channel	SP 20708 83199 - SP 20802	Moderate	21 August 2012;	24	Within land

Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
11-105b-B5	Brook		83502		07 September 2012; 03 October 2012		required
EC-11-106-J3- EC-11-106-G10	Hollywell Brook	Stream	SP 21066 83603 - SP 19933 83656	Majority	21 August 2012; 07 September 2012; 13 September 2012; 03 October 2012; 28 March 2013; 18 April 2013; 10 May 2013; 28 May 2013	24	Within land required
EC-11-106-J2 - EC-11-106-I1 040-OT2-156001 040-OT2-156002 040-OT2-156003	Hollywell Brook	Stream	SP 21306 83793 - SP 21066 83603	Full	20 May 2013; 13 June 2013	24	Within land required
EC-11-106-G1 - EC-11-106-F1	A tributary to River Blythe	Stream	SP 21160 84205 - SP 20902 84354	Majority	20 May 2013; 13 June 2013	24	30m, north-east
EC-11-106-E5 - EC-11-106-D7	A tributary to River Blythe	Stream	SP 20454 84329 - SP 20168 84354	Moderate	15 February 2013; 08 April 2013; 22 April 2013; 07 May 2013	24	Within land required
EC-11-105a-C6; EC-11-105a-B5; EC-11-106-F2	Park Farm Ponds	Ponds	SP 20751 83221; SP 20820 83404; SP 20830 84224	Full	21 August 2012; 07 September 2012; 13 September 2012; 25 September; 03 October 2012	24	Within land required
EC-11-106-F1	Pond east of Park Farm	Pond	SP 21010 84246	Full	20 May 2013; 13 June 2013	24	80m, north-east
EC-11-106-E1	Pond within land east of A452 Kenilworth	Pond	SP 20835 84438	Majority	19 December 2012; 09 May 2013;	24	100m, north-east

Map Code and/or Ecology Survey Code	Watercourse or water body name	Feature type	OS grid ref (start and finish)	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>115</sup> (m)
	Road and north of Packington Lane				06 June 2013		
EC-11-106-G8	Pond west of Middle Bickenhill Lane	Pond	SP 20226 83703	Majority	28 March 2013; 18 April 2013; 10 May 2013; 28 May 2013	24	Within land required
EC-11-135-E1 - EC-11-135-D3	River Tame	Main River	SP 16286 91405 - SP 16186 91188	Moderate	17 April 2013; 17 May 2013	25	10m, north
EC-11-135-D3 - EC-11-136-B9	River Tame	Main River	SP 16113 91087 - SP 14165 90184	Moderate	19 July 2012; 10 October 2012; 11 October 2012; 30 November 2012; 30 January 2012; 19 April 2013; 17 May 2013; 24 May 2013	25	Within land required
EC-11-135-C6 - EC-11-136-E8	Park Hall SINC Ponds	Ponds	SP 15765 90868 - SP 14857 90487	Majority	27 June 2012; 11 October 2012; 19 April 2013; 17 May 2013	25	Within land required

Key to level of access within required survey extent: full (100%); majority (75% - 99%); moderate (25-75%); little (>25%) and none (0%)

### 3.3 Deviations, constraints and limitations

- 3.3.1 Where surveys were constrained by access and three month intervals could not be achieved, the visits were as widely spaced as possible within the remaining time available, typically with a gap of three weeks or more between surveys.
- 3.3.2 Spot checks for otter field signs were conducted at all watercourse bridges within 2km rather than 5km of the route corridor due to significant land access constraints.
- 3.3.3 Due to significant land access constraints, a deviation was approved whereby otter surveys were undertaken only along those watercourses and on those water bodies within 100m (instead of 300m) of the land required for the construction of the Proposed Scheme. Where watercourses were at least in part within the land required for the construction of the Proposed Scheme, watercourses were subject to surveys to

a 300m (instead of 2km) extent both upstream and downstream of where they cross the land required for the construction of the Proposed Scheme.

3.3.4 Within the Balsall Common and Hampton-in-Arden area (CFA23) and the Birmingham Interchange and Chelmsley Wood area (CFA24), land access was possible to all but the smallest stretches of watercourse scoped for survey. Within the Castle Bromwich and Bromford area (CFA25), it was not possible to access Plants Brook or Dunlop Channel for detailed otter surveys due to lack of safe access; however these watercourses were sub-optimal for otter with egress from the watercourse itself difficult and suitable terrestrial habitat limited. Within the Castle Bromwich and Bromford area (CFA25) and the Washwood Heath to Curzon Street area (CFA26), some stretches of the River Tame Site of Local Importance for Nature Conservation (SLINC) were not accessible for survey where they ran alongside the M6 and under viaducts. These stretches were viewed using binoculars, and although it was possible that these stretches of the River Tame SLINC could have been used by otter for commuting, it was unlikely that there were enough suitable terrestrial habitats in these highly urbanised areas to sustain otter. Furthermore, dense sedge vegetation along the River Blythe, adjacent to Stonebridge roundabout, may have obscured field signs and led to under recording of otter activity along this stretch of the River Blythe.

3.3.5 Some stretches of watercourse or water bodies which were subject to survey, did not receive the full four visits, due to access constraints. The most significant access constraint was experienced in the Balsall Common and Hampton-in-Arden area (CFA23) around Bayleys Brook and on the River Blythe SSSI, just south of the A45 Birmingham Road. These areas provided large areas of suitable terrestrial habitat and food supply for otter, and were not subject to detailed terrestrial habitat searches for holts, which would otherwise have been undertaken.

## 3.4 Baseline

3.4.1 Stretches of watercourse or water body were scoped out from detailed otter survey where high speed, multiple lane roads severed connectivity with the land required for the construction of the Proposed Scheme, or where there was a lack of suitable terrestrial habitat for holts, cover and food supply, or where there was a high level of disturbance. The River Tame SLINC was not surveyed in some areas because the Proposed Scheme is in tunnel and does not affect the watercourse or other potential habitats.

3.4.2 Table 6o provides a summary of the holts, potential holts and couches recorded during surveys of CFA23, CFA24, CFA25 and CFA26 inclusive and these places of shelter are highlighted on the accompanying Volume 5: Map series EC-11.

Table 6o: Summary of holts, potential holts and couches recorded during surveys of CFA23, CFA24, CFA25 and CFA26 inclusive

Ecology survey code	Watercourse or water body name	OS grid reference	Nature of record <sup>116</sup>	CFA	Distance from land required for the construction of the Proposed Scheme <sup>117</sup> (m) and orientation
040-OT2-149001	Bayleys Brook	SP 24569 77615	Potential couch	23	Within land required
040-OT2-149002	Bayleys Brook, west of Baulk Lane	SP 24376 77964	Potential holt	23	Within land required
040-OT2-153001	Bayleys Brook at Marsh Lane Nature Reserve	SP 21738 80281	Potential couch	23	180m, south-west
040-OT2-154001	River Blythe	SP 21461 81731	Active holt (artificial) and possible holt	23	Within land required
040-OT2-154002	River Blythe	SP 21272 81601	Potential holt	23	Within land required
040-OT2-154003	River Blythe	SP 21320 81695	Potential holt (artificial) and other potential holts	23	Within land required
040-OT2-156001	Hollywell Brook	SP 20941 83544	Potential holt	24	Within land required
040-OT2-156002	Hollywell Brook	SP 20737 83533	Potential holt	24	Within land required
040-OT2-156003	Hollywell Brook	SP 20536 83648	Potential couch	24	Within land required
040-OT2-165001	River Tame	SP 16009 91018	Potential holt (artificial)	25	Within land required

Key to level of access within required survey extent: full (100%); majority (75% - 99%); moderate (25-75%); little (>25%) and none (0%).

## Balsall Common and Hampton-in-Arden (CFA23)

### *Bayleys Brook to the east of Lavender Hall Farm*

3.4.3

Otter spraints and footprints were regularly recorded along Bayleys Brook, within the land required, between September 2012 and May 2013. There was a well-defined slide on the edge of the brook, where the brook meandered around a field pond, with a well vegetated island in its centre. This slide was connected by a well-worn mammal track to another slide on the pond itself. These slides had been kept very clear over the period of a year, which indicated regular use by a large mammal.

<sup>116</sup> Potential holt identified by either a tunnel with internal diameter of at least 250mm and extending 1m into the bank or where the end is out of sight or any cavity of similar dimensions: drain pipe; log pile; rock/boulder pile; under structures such as bridges or buildings.

Active holts were identified where features met the potential holt criteria and the following: presence of otter spraints or footprints beside or inside tunnel; evidence of an animal's body rubbing against wall or roots; presence of hairs ca 25mm long and mid brown in colour; or presence of scratch marks.

<sup>117</sup>The phrase 'Within land required' represents an abbreviation of this term

3.4.4 More detailed terrestrial searches around this area confirmed that there was dense impenetrable cover between 20% and 50% of the area immediately adjacent to the river bank and there were features present which could conceal a breeding den. There was also a high quality local food supply, with signal crayfish in the River Blythe as identified during other surveys. The fisheries east of Lavender Hall Farm and the pond north-west of Lavender Hall Lane nearby also afforded a source of prey species including fish. The detailed terrestrial search identified a potential holt location (040-OT2-149002) within the land required, although this was not confirmed as active.

3.4.5 The overall suitability score for potential breeding sites of the area searched was 5/5 (highly suitable). The slide on the island in the centre of the pond (covered in dense scrub), coupled with the field signs, suggested that the island in the pond may be used by otter for holts, couches or laying up.

#### *Bayleys Brook east of A452 Kenilworth Road*

3.4.6 An otter spraint was found during one visit in January 2013 on Bayleys Brook, east of Kenilworth road (EC-11-1040-E6). Woodland and scrub close to the brook provided suitable terrestrial habitat for otter, with several other opportunities for creating holts. A potential couch location was identified (040-OT2-149001) within the land required. The food supply in this area was high quality as this stretch of brook was located between ponds at Marsh Lane Nature Reserve and the pond north-west of Lavender Hall Lane, both of which supported stocks of fish and crayfish.

3.4.7 The overall suitability score for potential breeding sites in this area was considered to be 5/5.

#### *River Blythe north of B4102 Meriden Road*

3.4.8 Historical records of otter activity were received from Birmingham and the Black Country Wildlife Trust for the River Blythe. These comprised three separate recordings of spraints, with a maximum of 11 spraints found on this stretch in 2006. The county otter recorder reported in 2013 that the artificial holt next to the river (040-OT2-154003), within the land required, had been used by otter in previous years.

3.4.9 Numerous otter spraints, footprints and characteristic feeding remains were recorded on the River Blythe SSSI, just north of the B4102 Meriden Road, between July 2012 and May 2013. More detailed terrestrial searches in this area, confirmed that there was dense impenetrable cover of less than 50% but more than 20% of the area immediately adjacent to the river bank and there were features present with potential to conceal a holt. There was a good food supply which consisted of fish and signal crayfish in the River Blythe SSSI and otter spraint and feeding remains indicated that crayfish formed a large part of otter diet in this area.

3.4.10 Detailed terrestrial searches confirmed the presence of an active artificial holt (040-OT2-154001) in March 2013 and identified further potential holt locations (040-OT2-154002 and 040-OT2-154003), all lying within the land required for the construction of the Proposed Scheme. The artificial holt in the flood plain on the north side of the River Blythe SSSI was thought to be active based on the footprints recorded next to it in March 2013. Almost directly opposite this on the south side of the river was a very large pile of logs and tree trunks which appeared to have collected in the field

following a past flooding event on the river. This also provided a suitable holt location, A camera trap was deployed on The River Blythe on the bank opposite the potential holt in May 2013, however the camera trap did not identify this potential holt as active at this stage.

- 3.4.11 Camera traps recorded an adult otter on two different days (25 May 2013 and 27 May 2013) at a site where feeding remains and spraints were found to be particularly concentrated (SP 21401 81456).
- 3.4.12 The overall suitability score for potential breeding sites in the area searched was 5/5 as an active otter holt was confirmed.

#### *River Blythe adjacent to Stonebridge roundabout*

- 3.4.13 Desk study records from Birmingham and the Black Country Wildlife Trust and Warwickshire County Otter Recorder showed multiple spraints under the A45 Coventry/Birmingham Road bridge at Stonebridge Island and on a tributary of the River Blythe SSSI. Eleven spraints were observed in 2006, and single spraints were observed in 2007, 2009 and 2011. No otter signs were recorded on the river itself during the 2013 surveys; however it was likely that this was due to reduced survey effort as a result of land access to the River Blythe SSSI, south of Stonebridge Island not being available for the whole survey season.
- 3.4.14 There were areas of scrub and woodland adjacent to the river and nearby ponds which provided suitable opportunities for holt creation. Dense beds of sedges provided ideal laying up sites. Crayfish and fish in the River Blythe SSSI, and the large ponds nearby, afforded a high quality food supply.
- 3.4.15 The overall suitability score for potential breeding sites in this area was considered to be 5/5.

#### ***Birmingham Interchange and Chelmsley Wood (CFA24)***

##### *Hollywell Brook adjacent to Middle Bickenhill Lane*

- 3.4.16 Historical records of otter spraint were received from the Birmingham and the Black Country Wildlife Trust for Hollywell Brook, and comprised of two records, where five spraints were observed in 2007, and a single spraint was observed in 2011.
- 3.4.17 Otter footprints, spraint, feeding remains and a potential slide were all found during field surveys on Hollywell Brook, west of the A452 Kenilworth Road, between January and May 2013.
- 3.4.18 More detailed terrestrial searches of Hollywell Brook were limited by restricted access following the opening of Park Farm Quarry in 2013. Terrestrial searches in restricted areas identified dense impenetrable cover between 20% -50% of the area immediately adjacent to the river bank and there were features present with potential to conceal holt sites, such as complex tangles of fallen trees and dense vegetation in the woodland. Large areas of sedge bed provided suitable laying up opportunities for otter. Feeding remains indicated that otter were feeding on mussels present in the brook.

3.4.19 The overall suitability score for potential breeding sites in the area searched was 5/5, however the opening of the quarry will be likely to cause disturbance to these previously less disturbed areas of suitable habitat.

### **Castle Bromwich and Bromford (CFA25)**

#### *River Tame SLINC at Park Hall SINC*

3.4.20 Historical records indicated the location of an artificial holt (040-OT2-165001) (Wildlife Trust pers comm April 2012), two otter (and one dead on the central reservation of the M6 near junction 5), spraints, paths and laying areas along the River Tame SLINC. These records were made between 2001 and 2012. The Environment Agency Biodiversity Officer (pers comm June 2012) suggested that, based on their knowledge of the aforementioned section of the River Tame SLINC, it can be assumed that otters visit the adjacent Park Hall on a fairly regular basis although no evidence of this was found during surveys.

3.4.21 Otter footprints were recorded on the River Tame SLINC, just north of Park Hall during a survey visit on 30 January 2013.

3.4.22 More detailed terrestrial search of the River Tame SLINC adjacent to Park Hall SINC confirmed that there was suitable, relatively undisturbed, terrestrial habitat for otter, with areas of dense impenetrable scrub on both sides of the river, and woodland approximately 200m away from the watercourse within Park Hall SINC. The River Tame afforded a good food supply of fish and the numerous ponds within Park Hall SINC supported stickleback and amphibians.

3.4.23 The overall suitability score for potential breeding sites in the area searched was 4/5 in accordance with standard methodology.

### **Washwood Heath to Curzon Street area (CFA26)**

3.4.24 The lack of records and positive field survey data was not unexpected given the developed nature of this area and the relative lack of suitable terrestrial habitat for otter. It should be noted however, that otter are capable of dispersing over long distances and occasionally through significant areas of unsuitable habitat. Consequently, the future occurrence of this species within this area should not be ruled out.

## 4 Water vole

### 4.1 Introduction

4.1.1 This section of the appendix presents details of baseline information relating to water vole (*Arvicola amphibius*) for the section of the Proposed Scheme that will pass through CFA23, CFA24, CFA25 and CFA26 inclusive.

### 4.2 Methodology

4.2.1 Details of the standard methodology used for water vole are provided in Ecology technical note: Ecological field survey methods and standards (Volume 5: Appendix CT-001-000/2).

4.2.2 Records of water vole were received from the following sources:

- Warwickshire Biological Records Centre<sup>118</sup>;
- EcoRecord<sup>119</sup>; and
- Amey (2012) MAC<sup>120</sup> 9 Outfall Surveys - Protected Species Surveys, M42 Outfalls, Site 5<sup>121</sup>.

4.2.3 A summary of locations of watercourses subject to water vole survey is provided in Table 61 and these are highlighted on the accompanying Volume 5: Map series EC-12.

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<sup>118</sup> Warwickshire Biological Records Centre; Warwickshire Museum; <http://heritage.warwickshire.gov.uk/ecology/data-and-ecological-records/warwickshire-biological-records-centre/>; accessed April 2012

<sup>119</sup> EcoRecord is the biological record centre for Birmingham and the Black Country (Dudley, Sandwell, Walsall & Wolverhampton).

EcoRecord; The Ecological Database for Birmingham and the Black Country; <http://www.ecorecord.org.uk/?q=home>; contacted April 2012.

<sup>120</sup> Motorway Area Contractor for the section of the M42 and M6 motorways and certain A roads affected by the proposed scheme.

<sup>121</sup> Amey (2012) MAC 9 Outfall Surveys - Protected Species Surveys, M42 Outfalls, Site 5

Table 61: Summary of water vole survey conducted in CFA23, CFA24, CFA25 and CFA26 inclusive

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
040-WV1-148005	A tributary to Bayleys Brook	Stream	SP 25538 77326 - SP 25444 77247	Full	22 May 2012; 06 April 2013	23	10m, north-east
040-WV1-147001 040-WV1-147002 040-WV1-148001 040-WV1-148002 040-WV1-148009	A tributary to Bayleys Brook	Stream	SP 25595 76805 - SP 25176 77033	Full	03 August 2012; 16 August 2012; 16 April 2013	23	Within land required
040-WV1-148010	Beechwood Farm Pond	Pond	SP 25299 77119	Majority	11 September 2012; 21 September 2012; 26 June 2013	23	Within land required
040-WV1-148014	Bayleys Brook (a tributary to the River Blythe SSSI)	Stream	SP 24937 76956 - SP 24913 77092	Majority	03 August 2012; 16 August 2012; 10 April 2013	23	110m, south-west
040-WV1-149010	A tributary to Bayleys Brook	Stream	SP 24578 77891 - SP 24495 77914	Full	07 September 2012; 27 September 2012	23	30m, north-east
040-WV1-149016	A tributary to Bayleys Brook	Stream	SP 24495 77914 - SP 24414 77920	Full	07 September 2012; 27 September 2012	23	Within land required
040-WV1-148017	Bayleys Brook (a tributary to the River Blythe SSSI)	Stream	SP 24913 77092 - SP 24919 77168	Majority	03 August 2012; 16 August 2012; 10 April 2013	23	40m, south-west
040-WV1-148018 040-WV1-148019 040-WV1-148020	Bayleys Brook (a tributary to the River Blythe SSSI) and	Stream and pond	SP 24919 77168 -- SP 24057 78693 SP 22723 79786 -	Majority	18 June 2012; 03 August 2012; 16 August 2012;	23	Within land required

<sup>122</sup>The phrase 'Within land required' represents an abbreviation of this term

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
040-WV1-148021 040-WV1-148022 040-WV1-149001 040-WV1-149007 040-WV1-149012 040-WV1-149015 040-WV1-149017 040-WV1-149020 040-WV1-149021 040-WV1-149022 040-WV1-149023 040-WV1-149026 040-WV1-150001	adjacent pond		SP 21798 80278 SP 24390 77965		06 September 2012; 07 September 2012; 27 September 2012; 04 October 2012; 17 October 2012; 10 April 2013; 10 May 2013; 28 May 2013		
040-WV1-150006	Bayleys Brook (a tributary to the River Blythe SSSI)	Stream and pond	SP 24057 78693 SP 24053 78570	Majority	10 May 2013; 28 May 2013	23	100m, north-east
040-WV1-150005 040-WV1-150010	Park Lane Field Ponds	Pond	SP 23687 78208	Majority	18 October 2012; 10 April 2013	23	Within land required
040-WV1-151004	Pond adjacent to Sixteen Acre Wood	Pond	SP 22800 79528	Majority	25 March 2013	23	Within land required
040-WV1-152006	Bayleys Brook (a tributary to the River Blythe SSSI)	Stream	SP 21798 80278 SP 21928 80262	Majority	06 September 2012; 04 October 2012	23	10m, south-west
040-WV1-153011	Horn Brook (a tributary to the River Blythe SSSI)	Stream and pond	SP 22551 81311; SP 22410 81323	Full	20 May 2013; 13 June 2013	23	130m, north-east
040-WV1-153015 040-WV1-153017	Horn Brook (a tributary to the River Blythe SSSI)	Stream and pond	SP 22410 81323- SP 22192 81226; SP 22263 81396	Full	20 May 2013; 13 June 2013	23	Within land required
040-WV1-153019	Marsh Lane Nature Reserve	Pond	SP 21778 80812	Full	06 September 2012;	23	Within land required

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
	Pond				04 October 2012		
040-WV1-153012 040-WV1-153013 040-WV1-153018 040-WV1-153020 040-WV1-153023 040-WV1-153024	Horn Brook (a tributary to the River Blythe SSSI)	Stream	SP 21552 80846 - SP21893 81518	Majority	06 September 2012; 19 September 2012; 04 October 2012; 01 May 2013	23	Within land required
040-WV1-153029	Horn Brook (a tributary to the River Blythe SSSI)	Stream	SP 21958 81351 - SP 21849 81280	Majority	19 September 2012; 01 May 2013	23	40m, north-east
040-WV1-153030	Horn Brook (a tributary to the River Blythe SSSI)	Stream	SP 21893 81518 - SP 21958 81351	Majority	19 September 2012; 01 May 2013	23	150m, north-east
040-WV1-153036	Horn Brook (a tributary to the River Blythe SSSI)	Stream	SP 21829 81474 - SP 21849 81280	Majority	19 September 2012; 01 May 2013	23	20m, north-east
040-WV1-153033	A tributary to Bayleys Brook	Stream	SP 21375 81027 - SP 21442 81214	Full	19 September 2013; 01 May 2013 28 May 2013	23	80m, south-west
040-WV1-153035	A tributary to Bayleys Brook	Stream	SP 21442 81214 - SP 21506 81309	Full	19 September 2013; 01 May 2013 28 May 2013	23	Within land required
040-WV1-153026	River Blythe SSSI	Main River	SP 21515 80717 - SP 22014 82039	Majority	19 September 2012; 01 May 2013	23	110m, south-west
040-WV1-153028 040-WV1-154002 040-WV1-154006 040-WV1-154014 040-WV1-154016	River Blythe SSSI	Main River	SP 21541 80859 - SP 21839 81757	Majority	25 July 2012; 19 September 2012; 11 October 2012; 10 April 2013; 01 May 2013	23	Within land required

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
040-WV1-154003	River Blythe SSSI	Main River	SP 21839 81757 - SP 22014 82039	Majority	10 April 2013; 01 May 2013 28 May 2013	23	210m, north-east
040-WV1-154004 040-WV1-154007	River Blythe SSSI and small tributaries	Main River	SP 22051 82110- SP 22324 82120	Moderate	20 May 2013; 13 June 2013	24	410m, north-east
040-WV1-154010	River Blythe SSSI and small tributaries	Main River	SP 22051 82110 - SP 21853 82380	Moderate	20 May 2013; 13 June 2013	23	410m, north-east
040-WV1-154017	Blythe Floodplain ponds	Pond	SP 21444 81740	Full	10 April 2012; 25 July 2012; 11 October 2012	23	Within land required
040-WV1-154019	Shadow Brook	Stream	SP 21598 82527 - SP 21468 82368	Moderate	19 September 2012; 01 May 2013	23	60m, north-east
040-WV1-155006 040-WV1-155008 040-WV1-155012	Shadow Brook	Stream	SP 21468 82368 - SP 20768 82352	Moderate	28 August 2012; 13 September 2012; 19 September 2012; 01 May 2013	23	Within land required
040-WV1-155013	Shadow Brook	Stream	SP 20768 82352 - SP 20640 82245	Moderate	28 August 2012; 13 September 2012; 03 October 2012	23	100m, south-west
040-WV1-155016	Shadow Brook	Stream	SP 20640 82245 - SP 20456 82158	Moderate	28 August 2012; 13 September 2012; 03 October 2012	23	210m, south-west
040-WV1-155002	Small tributary of River Blythe SSSI	Main River	SP 21632 82504 - SP 21809 82302	Moderate	20 May 2013; 13 June 2013	23	200m, north-east
040-WV1-155018	Pond south of Pasture Farm	Pond	SP 20853 82588	Full	28 August 2012; 13 September 2012	23	50m, north-west

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
					03 October 2012		
040-WV1-155021	Pond south-west of Pasture Farm	Pond	SP 20759 82709	Full	28 August 2012; 13 September 2012 03 October 2012	23	130m, west
040-WV1-154018	River Blythe SSSI and small tributaries	Main River	SP 21892 82474 - SP 21853 82380	Moderate	20 May 2013; 13 June 2013	24	420m, north-east
040-WV1-155001	River Blythe SSSI and small tributaries	Main River	SP 21888 82411 - SP 21811 82479	Moderate	20 May 2013; 13 June 2013	24	190m, north-east
040-WV1-155003	River Blythe SSSI and small tributaries	Main River	SP 21811 82479 - SP 21692 82539	Moderate	20 May 2013; 13 June 2013	24	80m, north-east
040-WV1-155017	River Blythe SSSI	Main River	SP 21437 83081 - SP 21411 83185	Moderate	13 June 2013	24	Within land required
040-WV1-155009	River Blythe SSSI and small tributaries	Main River	SP 21510 82926 - SP 21566 82883	Moderate	20 May 2013; 13 June 2013	24	20m, north-east
040-WV1-155014	Golf Course Pond	Pond	SP 21542 83077	Little	10 May 2013; 03 June 2013	24	10m, north-east
040-WV1-155020	River Blythe SSSI	Main River	SP 21397 83198 - SP 21390 83507	Full	20 May 2013; 13 June 2013	24	Within land required
040-WV1-156001	Tributary to Hollywell Brook	Channel	SP 20708 83199 - SP 20802 83502	Moderate	07 September 2012; 03 October 2012	24	Within land required
040-WV1-156002	Hollywell Brook	Stream	SP 21339 83824 - SP 21066 83603	Majority	20 May 2013; 13 June 2013	24	Within land required
040-WV1-156004 040-WV1-156005	Hollywell Brook	Stream	SP 21066 83603 - SP 20301 83666	Majority	07 September 2012; 03 October 2012	24	Within land required

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
040-WV1-156007 040-WV1-156009 040-WV1-156010 040-WV1-156014 040-WV1-156016							
040-WV1-156006 040-WV1-156008	A tributary to River Blythe SSSI	Stream	SP 21160 84205 - SP 20902 84354	Majority	20 May 2013; 13 June 2013	24	Within land required
040-WV1-156003 040-WV1-156006	Park Farm Ponds	Ponds	SP 20751 83221; SP 20823 83408	Full	07 September 2012; 03 October 2012	24	Within land required
040-WV1-156011 040-WV1-156013	Ponds east of A452 Chester Road and south of Packington Lane	Ponds	SP 20830 84224	Full	07 September 2012; 03 October 2012	24	Within land required
040-WV1-156017	Pond south of Packington Lane	Pond	SP 21007 84250	Majority	20 May 2013; 13 June 2013	24	70m, north-east
040-WV1-159002	Coleshill & Bannerly Pools SSSI	Pools	SP 19878 86192; SP 19891 85927	Moderate	30 April 2013; 30 May 2013	24	Within land required
040-WV1-165001	River Tame SLINC	Main River	SP 16286 91405 - SP 16186 91188	Moderate	17 April 2013; 17 May 2013	25	90m, north
040-WV1-165002	River Tame SLINC	Main River	SP 16186 91188 - SP 16113 91087	Moderate	10 October 2012; 24 May 2013	25	10m, north
040-WV1-165007 040-WV1-165008 040-WV1-165013 040-WV1-166001 040-WV1-166006 040-WV1-166007	River Tame SLINC	Main River	SP 16113 91087 - - SP 14499 90254	Moderate	26 July 2012; 10 October 2012; 11 October 2012; 24 May 2013	25	Within land required

Ecology survey code	Watercourse or water body name	Feature type	OS grid reference	Level of access within required survey extent	Survey dates	CFA	Distance from land required for the construction of the Proposed Scheme <sup>122</sup> (m)
040-WV1-166008 040-WV1-166011 040-WV1-166012 040-WV1-166013 040-WV1-166014 040-WV1-166015 040-WV1-166024 040-WV1-167004 040-WV1-167007 040-WV1-167011 040-WV1-167012							
040-WV1-167014 040-WV1-167016	River Tame SLINC	Main River	SP 14499 90254- SP 14165 90184	Moderate	26 July 2012; 10 October 2012; 11 October 2012; 24 May 2013	25	10m, south
040-WV1-165003 040-WV1-165012 040-WV1-165014 040-WV1-165018 040-WV1-165020 040-WV1-166022 040-WV1-167001 040-WV1-167002 040-WV1-167003 040-WV1-167006 040-WV1-166010 040-WV1-166017 040-WV1-166018 040-WV1-166023	Park Hall SINC Ponds	Pond	SP 15765 90868 SP 14857 90487	Majority	28 June 2012; 11 October 2012; 19 April 2013; 17 May 2013	25	Within land required

Key to level of access within required survey extent: full (100%); majority (75% - 99%); moderate (25-75%); little (>25%) and none (0%).



## 4.3 Deviations, constraints and limitations

4.3.1 Water vole surveys continued into October 2012 as a result of the suitable weather conditions. However, the cut-off date for survey work in 2013 meant that the minimum survey period between survey replicates was reduced from eight weeks to three at some locations.

4.3.2 Due to significant land access constraints, a deviation was approved whereby watercourses which ran within the land required were surveyed to 300m (instead of 500m) upstream and downstream from the land required for the construction of the Proposed Scheme.

4.3.3 Within the Balsall Common and Hampton-in-Arden area (CFA23) and the Birmingham Interchange and Chelmsley Wood area (CFA24), land access was possible to the majority (approximately 85%) of watercourse and water bodies scoped for survey, with the exception of the ponds within Marsh Lane Nature Reserve. This site provided suitable terrestrial habitat and food sources for water vole, and it was possible that water vole were present here. Within the Castle Bromwich and Bromford area (CFA25), it was not possible to access Plants Brook or Dunlop Channel for water vole surveys; however these watercourses had concrete banks for much of their length making them unsuitable for water vole. Within the Castle Bromwich and Bromford area (CFA25) and the Washwood Heath to Curzon Street area (CFA26), some stretches of the River Tame SLINC where it runs alongside the M6 and under viaducts and the River Rea SLINC were not accessible for survey. Surveys of short stretches of this watercourse were made where possible, using binoculars. It was assessed as being unsuitable for water vole along much of its length owing to its concrete sides and lack of suitable terrestrial habitat. The River Tame SLINC became more suitable for water vole as it exited Birmingham City Centre to the east, just before it reached Park Hall SINC.

4.3.4 Some water bodies and stretches of watercourse which were subject to survey, did not receive two visits, due to access constraints. This included part of Bayleys Brook in the Balsall Common and Hampton-in-Arden area (CFA23).

4.3.5 Islands within ponds were not accessible for survey due to surveyor safety issues regarding the use of boats. Stretches of the River Blythe SSSI south of the A45 Coventry Road were inaccessible due to impenetrable vegetation at the time when access was granted within the Balsall Common and Hampton-in-Arden area (CFA23). Not all ponds at Marsh Lane Nature Reserve within the Balsall Common and Hampton-in-Arden area (CFA23) were accessible for survey. At Coleshill & Bannerly Pools SSSI within the Chelmsley Wood and Birmingham Interchange area (CFA24), large floating mats of vegetation prevented safe access to the southernmost of the two pools.

## 4.4 Baseline

4.4.1 Stretches of watercourse as well as individual water bodies were scoped out from detailed water vole survey where high speed, multiple lane roads severed connectivity

with the land required for the construction of the Proposed Scheme, or where there

Ecology survey code	Name of watercourse	Location	OS grid reference	Nature of activity recorded	CFA	Distance from land required for the construction of the Proposed Scheme (m)
040-WV1-167014	River Tame SLINC	Bank of River Tame SLINC	SP 14352 90214	Latrine at water's edge, with footprints recorded nearby. A few burrows were recorded in the southern bank of River Tame SLINC.	25	10m, south
040-WV1-167011	River Tame SLINC	Bank of River Tame SLINC	SP 14580 90301	Footprints recorded at water's edge. A few burrows were recorded in the southern bank of River Tame SLINC.	25	Within land required
040-WV1-165014	Pond at Park Hall SINC in the vicinity of the River	Park Hall SINC	SP 15901 90919	Water vole presence corroborated by feeding signs recorded around a pond at Park Hall SINC on two occasions.	25	Within land required

was a lack of suitable bank substrate for burrowing and terrestrial habitat for foraging such as the brick sections of watercourses within the Washwood Heath to Curzon Street area (CFA26). On some occasions water bodies and watercourses were scoped out due to a lack of connectivity with adjacent areas of appropriate habitat or due to the ephemeral nature of the watercourses and water bodies concerned.

	Tame SLINC						
4.4.2	Table 62	Table 62 provides a summary of water vole activity identified within CFA23, CFA24, CFA25 and CFA26 inclusive and locations are highlighted on the accompanying Volume 5: Map series EC-12.					

Table 62: Summary of water vole activity identified within CFA23, CFA24, CFA25 and CFA26 inclusive

Ecology survey code	Name of watercourse	Location	OS grid reference	Nature of activity recorded	CFA	Distance from land required for the construction of the Proposed Scheme <sup>123</sup> (m)
040-WV1-167014	River Tame SLINC	Bank of River Tame SLINC	SP 14352 90214	Latrine at water's edge, with footprints recorded nearby. A few burrows were recorded in the southern bank of River Tame SLINC.	25	10m, south
040-WV1-167011	River Tame SLINC	Bank of River Tame SLINC	SP 14580 90301	Footprints recorded at water's edge. A few burrows were recorded in the southern bank of River Tame SLINC.	25	Within land required
040-WV1-165014	Pond at Park Hall SINC in the vicinity of the River Tame SLINC	Park Hall SINC	SP 15901 90919	Water vole presence corroborated by feeding signs recorded around a pond at Park Hall SINC on two occasions.	25	Within land required

<sup>123</sup>The phrase 'Within land required' represents an abbreviation of this term

4.4.3 A protected species survey carried out by Amey PLC in 2012<sup>124</sup> recorded water vole feeding signs, a latrine and a potential burrow at the southern most of the two pools within Coleshill & Bannerly Pools SSSI. Two water vole surveys were conducted at this site in 2013 in favourable weather conditions. No field signs of water vole were observed during the course of these surveys, though habitat suitable for water vole was identified. Surveys were restricted by the dense mats of floating vegetation which prevented safe access to the water's edge.

4.4.4 Past records of presence relating to stretches of the Birmingham and Fazeley Canal and the Grand Union Canal from 2002-2005 have not been considered further in this report as the 2012 and 2013 surveys proved that they are no longer suitable for providing foraging habitat or places of shelter for this species. Surveys conducted on the canals during 2012 and 2013 subsequently identified these stretches of watercourse as being unsuitable for this species since it was a brick lined channel with intermittent stands of scrub on its southern bank. Furthermore, adjoining land use included industrial and amenity developments.

4.4.5 The positive survey results for water vole on the River Tame SLINC just west of Park Hall SINC were consistent with the desk study records from EcoRecord observed in 2006 and 2011 for this stretch of the river. There was also a possible evidence of water vole foraging recorded twice in 2012 at a pond (040-WV1-165014) within Park Hall SINC which is close to the River Tame SLINC. It is probable that a small population of water vole is restricted to suitable habitat within a section of the River Tame SLINC just west of Park Hall SINC, and a pond within the Park Hall SINC.

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<sup>124</sup>Amey (2012) MAC 9 Outfall Surveys - Protected Species Surveys, M42 Outfalls, Site 5.

## 5 Dormouse

### 5.1 Introduction

5.1.1 This section of the appendix presents a summary of the baseline data relating to hazel dormice (*Muscardinus avellanarius*) for the section of the Proposed Scheme that will pass through CFA23, CFA24, CFA25 and CFA 26 inclusive.

### 5.2 Methodology

5.2.1 Details of the standard methodology used for hazel dormouse are provided in Ecology technical note: Ecological field survey methods and standards (Volume 5: Appendix CT-001-000/2). The survey methodology involved nest tube and hazelnut surveys to help determine presence.

5.2.2 Past records of hazel dormouse were requested from the following sources:

- Warwickshire Biological Records Centre<sup>125</sup>; and
- EcoRecord<sup>126</sup>.

5.2.3 Table 63 provides a summary of the number of nest tubes, duration of deployment and index of probability scores<sup>127</sup> obtained in accordance with standard methodology (Chanin and Woods, 2003)<sup>128</sup> for each nest tube survey undertaken within CFA23, CFA24, CFA25 and CFA26 inclusive. The survey site locations are highlighted on the accompanying Volume 5: Map series EC-12.

Table 63: Methodological details for dormouse nest tube surveys conducted within CFA23, CFA24, CFA25 and CFA26 inclusive

Ecology survey code	Location	Centroid grid reference	Number of tubes deployed	Survey start - survey end	Sum of indices of probability <sup>129</sup>	Map series and sheet number reference
040-HD1-148001	Beechwood Farm	SP 254 771	50	July 2012 - May 2013 (not checked in April 2013)	22	Volume 5: Map EC-12-100b
040-HD1-150001	Wood at Park Lane, near Heart of England Way	SP 236 785	25	April 2013- August 2013	7	Volume 5: Map EC-12-102
040-HD1-151001	Marlowes wood	SP 233 790	50	April 2013- August 2013	14	Volume 5: Map EC-12-102

<sup>125</sup> Warwickshire Biological Records Centre; Warwickshire Museum; <http://heritage.warwickshire.gov.uk/ecology/data-and-ecological-records/warwickshire-biological-records-centre/>; accessed April 2012

<sup>126</sup> EcoRecord is the biological record centre for Birmingham and the Black Country (Dudley, Sandwell, Walsall & Wolverhampton).

EcoRecord; The Ecological Database for Birmingham and the Black Country; <http://www.ecorecord.org.uk/?q=home>; contacted April 2012.

<sup>127</sup> Sum of the index of probability scores obtained for the months tubes were deployed, adjusted based on the number of tubes deployed in comparison with the standard of 50 tubes.

<sup>128</sup> Chanin, P. and Woods, M. (2003). Surveying dormice using nest tubes: results and experiences from the South West Dormouse Project. English Nature Research Report 524. Peterborough: English Nature 34pp.

<sup>129</sup> Sum of the index of probability scores obtained for the months tubes were deployed, adjusted based on the number of tubes deployed in comparison with the standard of 50 tubes.

Ecology survey code	Location	Centroid grid reference	Number of tubes deployed	Survey start - survey end	Sum of indices of probability <sup>129</sup>	Map series and sheet number reference
040-HD1-152001	Sixteen Acre Wood	SP 228 796	50	April 2013- August 2013	14	Volume 5: Map EC-12-103 and EC-12-103
040-HD1-165001 and 040-HD1-165002	Park Hall SINC (Parkhall Wood, Parkhill Wood and Langley Wood)	SP 163 909	50	July 2012- May 2013 (not checked in April 2013)	22	Volume 5: Map EC-12-135 and EC-12-136

## 5.3 Deviations, constraints and limitations

5.3.1 Due to access restrictions, it was not possible to complete survey visits to three sites; the wood at Park Lane, near Heart of England Way (040-HD1-150001), Marlowes wood (040-HD1-151001) and Sixteen Acre Wood (040-HD1-152001). Therefore, these sites had scores less than 20, which constitute a deviation from the approved methodology.

5.3.2 Table 64 provides a summary of areas where no access for survey was permitted.

Table 64: Areas where access was not permitted for survey within CFA23, CFA24, CFA25 and CFA26 inclusive

Ecology survey code	Location	Centroid grid reference	CFA	Distance from land required for the construction of the Proposed Scheme <sup>130</sup> (m)
040-HD1-152002	Woodland north of Berkswell Marsh SSSI	SP 227 800	23	10m, north-east
040-HD1-152003	Woodland north of Marsh Farm and east of A452 Kenilworth Road	SP 224 802	23	Within land required

## 5.4 Baseline

5.4.1 No past records of hazel dormice were received for the study area within CFA23, CFA24, CFA25 and CFA26 inclusive.

5.4.2 Potentially suitable sites for survey were identified from aerial photographs, OS maps and Phase 1 Habitat Survey scoping. These included blocks of woodland and interconnected species rich hedgerows.

5.4.3 In the Balsall Common and Hampton-in-Arden area (CFA23), habitat assessment in the field resulted in the removal of two potentially suitable sites to be surveyed, the wood east of Hodgetts Lane and south of Truggist Lane (EC-12-100b-D1) and at the land east of Diddington Lane and west of A452 Kenilworth Road (EC-12-104-B5),

<sup>130</sup>The phrase 'Within land required' represents an abbreviation of this term

which were assessed as unsuitable for hazel dormice. The wood east of Hodgetts Lane and south of Truggist Lane was dominated by coniferous plantation and lacked both an understorey and herbaceous layer and suitable connecting habitat. Diddington Lane included a network of tall, intact hedgerows; however, the hedgerows lacked connectivity (particularly to woodland blocks of greater than 1ha in size) and supported a limited range of food plants.

- 5.4.4 Three potentially suitable sites were identified within the Birmingham Interchange and Chelmsley Wood area (CFA24). All of these sites were scoped out following a habitat assessment due to sparsely vegetated woodland that lacked both an understorey and shrub layer or insufficient size of suitable habitat to support hazel dormice.
- 5.4.5 Suitable habitat (comprising blocks of broad-leaved semi-natural woodland, with understorey and herbaceous layer and connecting habitat) in the Castle Bromwich and Bromford (CFA25) was found within the wood at Park Hall SINC.
- 5.4.6 There is no suitable connecting habitat for hazel dormice to sites within Washwood Heath to Curzon Street area (CFA26).

### **Balsall Common and Hampton-in-Arden (CFA23)**

- 5.4.7 A nest tube survey was initiated at four sites considered potentially suitable for dormouse.
- 5.4.8 The completed nest tube survey of Beechwood Farm (040-HD1-148001) did not find evidence of hazel dormouse. No nut search was undertaken at Beechwood Farm as there was limited presence of hazel (*Corylus avellana*).
- 5.4.9 An incomplete nest tube survey of Sixteen Acre Wood (040-HD1-152001) was undertaken, which resulted in a survey effort score of 14 out of 20 in accordance with standard methodology. No evidence of hazel dormouse was recorded; however, wood mice (*Apodemus sylvaticus*) were observed nesting in the tubes. Sixteen Acre Wood (040-HD1-152001) contains suitable dormouse habitat and is well connected to further woodland habitat in the wider landscape. A withdrawal of permitted access prevented a hazel nut search from being undertaken. Hazel dormice can be difficult to detect, particularly at low densities, their presence is considered unlikely given the lack of records and negative survey results, but cannot be ruled out.
- 5.4.10 A nest tube survey of Marlowes wood (040-HD1-151001) was initiated; however, due to access constraints the survey was terminated prior to sufficient survey effort being achieved. No evidence of hazel dormouse or any other small mammal was recorded. The withdrawal of permitted access prevented a hazel nut search from being undertaken. As this site is directly connected by suitable dormouse habitat to Sixteen Acre Wood (040-HD1-152001), the presence of the species cannot be confidently discounted.
- 5.4.11 A partial nest tube survey was undertaken at the wood at Park Lane (040-HD1-150001) situated near to the Heart of England Way. This small wooded block (containing approximately 0.5ha of suitable habitat) was partially connected to the wider landscape. A withdrawal of permitted access prevented a hazel nut search from being

undertaken. No evidence of dormouse was recorded. The small size and limited connectivity has resulted in the assessment that hazel dormouse are likely to be absent.

5.4.12 No access for survey was permitted at woodland north of Berkswell Marsh SSSI (040-HD1-152002) and the woodland north of Marsh Farm and east of A452 Kenilworth Road (040-HD1-152003). However, due to their limited extent, these areas were assessed as less likely to support hazel dormouse than the surrounding woodland (which was accessible for survey and which was negative), therefore, dormouse were likely absent from these woodland parcels.

#### **Chelmsley Wood and Birmingham Interchange (CFA24)**

5.4.13 No sites within this section of the route were considered to be of sufficient quality to support hazel dormouse, and therefore no further surveys were carried out within this area.

#### **Castle Bromwich and Bromford (CFA25)**

5.4.14 The wood at Park Hall SINC (040-HD1-165001 and 040-HD1-165002) contains a fragment of Ancient Semi Natural Woodland which contained a range of food plants (including hazel) interconnected by a well-developed understorey. However, neither the nest tube survey nor the hazelnut search identified signs of hazel dormouse following completion of the survey visits.

#### **Washwood Heath to Curzon Street (CFA26)**

5.4.15 No potentially suitable sites for hazel dormouse were identified within this area.

## 6 References

Amey (2012), *MAC 9 Outfall Surveys - Protected Species Surveys, M42 Outfalls, Site 5*.

Chanin, P. and Woods, M. (2003), *Surveying dormice using nest tubes: results and experiences from the South West Dormouse Project*. English Nature Research Report 524. Peterborough: English Nature 34pp.

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